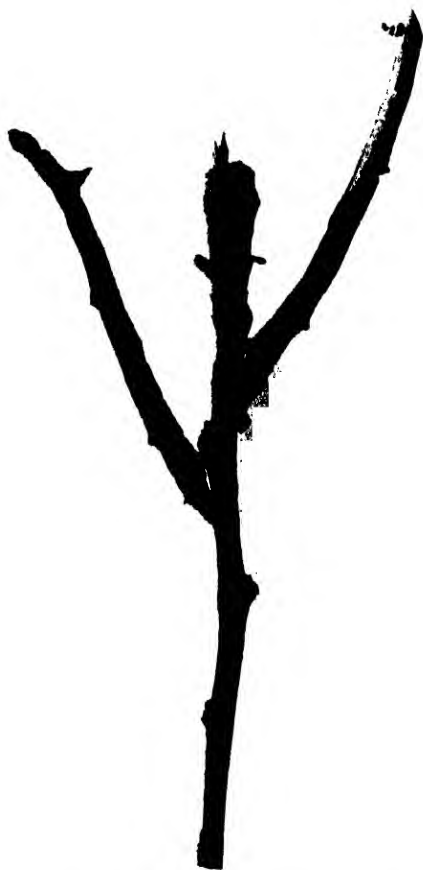


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A single twig, with two "stick" caterpillars standing erect on either side, in imitation of other twigs.

"NATURE'S NURSERY"

OR

"CHILDREN OF THE WILDS"

BY

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AUTHOR OF

"NATURE'S RIDDLES," "THE LAY OF THE WEE BROWN WREN"

WITH 240 ILLUSTRATIONS FROM NATURE

BY THE AUTHOR

LONDON

HUTCHINSON & CO.

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1905

NATURE'S NURSERY

OR

CHILDREN OF THE WILDS



Dedication

NOT BY ANY MEANS DO I WISH TO IMPLY—IN DEDICATING THIS BOOK TO YOU, MOLLIE—THAT THE ABOVE SUB-TITLE COULD POSSIBLY INCLUDE YOURSELF; BUT I HAVE, NEVERTHELESS, FREQUENTLY ENTERTAINED DOUBTS AS TO WHETHER YOU ARE *ALWAYS* AS GOOD AS YOU APPEAR UPON THIS PAGE.

H. W. S-W.

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AUTHOR'S NOTE

ENCOURAGED by the very kind reception which has been accorded to "Nature's Riddles" by the Press of the United Kingdom, I have been led to compile this record of the nursery days of several branches of animal life; besides having penetrated, to some considerable extent, into the mysteries of Flora's Nursery.

This work lays no claim to any perfection of style or composition, or literary ability whatsoever, but is merely an attempt to describe, in an easy and palatable form, the wonders illustrated therein. For this reason I have, as far as possible, avoided all technicalities.

It has been my endeavour to include within these covers something for every one, young or old. Let my readers pick and choose; and if each can find something which appeals to his own individual taste, I shall be satisfied.

I may mention that the photographs in this work are all taken by myself, and—with the exception of two or perhaps three instances, which are clearly stated to be otherwise—from the actual living subjects.

H. W. S.W.



PROLOGUE

A PASSING SHADOW

I WAS walking alone in my garden in the freshness of early
morn,
As the wild lark's trickling chorus soared through the azure
dawn ;
Each bough was bedecked with beauty, each bloom with a
radiant hue,
And the red rose shone with glory at the kiss of the
sparkling dew.

Lo ! a butterfly flecked with crimson sails softly across my
way,
In the blush of her new-born freedom and the pride of her
rich array ;
And I marvel awhile at the lustre that sheds from her
plumage bright,
As she chases the shimmering sunbeams, and sports in the
golden light.

* * * * *

I was walking again in my garden, in the light of the moon-
flushed snow,
As the shivering stars peep shyly at the frost-bound sleep
below ;
While the song of the lark has yielded to the moan of the
northern wind,
And naught of the red rose lingers but the memory in my
mind.

And there in a sheltered corner, half smothered in leaves
and waste,
Lay the form of the radiant fairy, the pride of her strength
abased :
'Tattered and torn and broken, her head in the dust she
bowed,
'The dress of her royal splendour cast off for a funeral
shroud.

'Then I stoop o'er the lonely fragment, and mourn for the
days of yore,
When the smile of the sunlight glinted on the form that
would move no more !
For she came as a passing shadow, for a while in the
summer sun,
And now her brief sojourn is ended, her days on the earth
are done !

* * * * *

Lo ! methought that the ghost of a flutter bestirred from the
quivering wing,
As the last of the death-throes tightened his grip on the
struggling thing !—
Till I saw 'twas the rude wind's jesting that shook the limp
helpless form,
And mocked with a merciless banter the husk of the life
that was gone,

PROLOGUE

11

And then as the snowflakes gather, to hide with a pitying
hand,
I wonder if that tiny spirit has flown to another land ;
Or whether the blush of her beauty has bloomed for this
earth alone,
And faded away into darkness in the vault of the Great
Unknown !



INTRODUCTION

IT would seem but fitting, ere we take a peep through any of the windows of the great nursery where Nature's children are at play, that some reference should be made to the little tragedy of Death—that "curtain-raiser" which, if not a *necessary*, is at any rate only too often the inseparable, antecedent of the Drama of Life. For, as in the case of the mythical Phoenix of old, it is out of death that life springs more abundantly—a maxim which largely rules the lower departments of the animal creation, and repeats itself in symbolic, if not in actual form throughout the vegetable kingdom. "Except a corn of wheat fall to the ground and *die*, it abideth alone, but if it die, it bringeth forth much fruit."

This natural law is particularly true in Butterfly-land. The average life of one of these radiant fairies extends over a matter of *weeks*, or in some cases, months; but if the period were to be one of *years*, instead of weeks, the result would be that we should not have nearly so many butterflies! This may appear, at first sight, to be a hideous paradox; but the explanation will be quite clear when we remember that the butterfly does not lay her eggs until just before her death. Accordingly let us assume that in the year 1900 there was only one Red Admiral butterfly in my garden, and that her life lasts four

years : there would then be no more until 1904. Whereas, if she dies that same year, there will be *at least* a score of her progeny sunning themselves upon the bright faces of my Giant Daisies in 1901 (making a very liberal allowance for casualties); and this happy throng, increasing by geometrical progression, would have become many thousand times as numerous in 1904.

If my readers like to work it out, they will find that it is a very similar case to that of the old story of the eccentric gentleman who wanted to sell a valuable horse, and asked an intending purchaser to give a penny for the first nail in the animal's shoes, doubling the amount for each of the other nails in the four shoes. The buyer jumped at the offer, and directed his agent to send a cheque for the amount, deeming that it could not possibly amount to more than a few pounds, and that the owner must assuredly be going off his head if he were willing to part with so valuable an animal for a mere song. The buyer's gratification at the fancied bargain somewhat cooled when he discovered that the sum amounted to over 2000 guineas !

Now, although it is not in accordance with the rules of strict logic to allow the conclusion that the death of the parent butterfly is the actual *cause* of this subsequent increase of life, nevertheless it happens that the former is in very many cases the invariable precedent—a subtle distinction which I well remember being impressed upon me by my College tutor, who had a playful habit of illustrating his instruction with the help of small pieces of pink-and-white blotting-paper, placing them in a row on the back of a chair, to represent the different factors in

a logical "syllogism," in order that the mysteries of the various formulæ might be the more vividly engrafted upon the minds of his audience.

The beautiful Red Admiral, the Peacock, and certain other species, which come out of the chrysalis in the Autumn, do not dream of troubling themselves with family cares until the following Spring, sleeping through the winter in some warm crevice, and not stirring abroad until the opening leaves are ready to provide food for their offspring. Other species come out in the Spring,—having lain in the chrysalis state all the Winter,—and fritter away their lives in giddiness and pleasure, nor do they begin to lay their eggs until they feel that their allotted span of life is drawing to a close.

The dead butterfly in my illustration is the only one that I have ever found that had apparently died a natural death. Do any of my readers ever remember to have picked up a dead butterfly? Of course, I except such remains as are frequently found in spider-webs, or dropped by sparrows, and which can be easily distinguished by their excessively mutilated condition. What happens to dead butterflies? Can it be that every one has fallen a victim to some greedy foe, and that only about one in a million is permitted to die in peace? The solution is wrapped in mystery. I shall not try to explain it, for I cannot; neither have I met any one who could.

Look at yonder woodland bank, literally ablaze with scores of fairies, decked in vivid blue, which glow like living jewels among the blossoms. But if you seek again the same spot, ere it begins to feel the soft touch of the leaves which will drop from the trees overhead at the first breath of frost, it is quite

certain that you will not find a single member of that dazzling array. Where are they?

* * * * *

Some of Nature's ways are simple and straightforward enough, but others are complex and difficult to unravel; so I will now ask my readers to accompany me in a few peeps behind the curtain which hides from us the fascinating secrets of Nature's Nursery.

NATURE'S NURSERY

PART I

JOTTINGS FROM THE FARMYARD

CHAPTER I

THE TALE OF THE CHICKEN



A happy family.

AMONG the most interesting dramas that are produced from time to time upon the stage of Nature's Nursery must be ranked the Tale of a Chicken.

I have intentionally selected the egg of a domestic hen, from which to take my series of pictures, in

preference to that of a wild bird of any kind, inasmuch as it would have been well-nigh impossible to experiment with any of the latter without causing the timid parent to desert her nest; and, moreover, the process by which the child of the barndoor fowl makes his advent into the world is precisely

18 JOTTINGS FROM THE FARMYARD

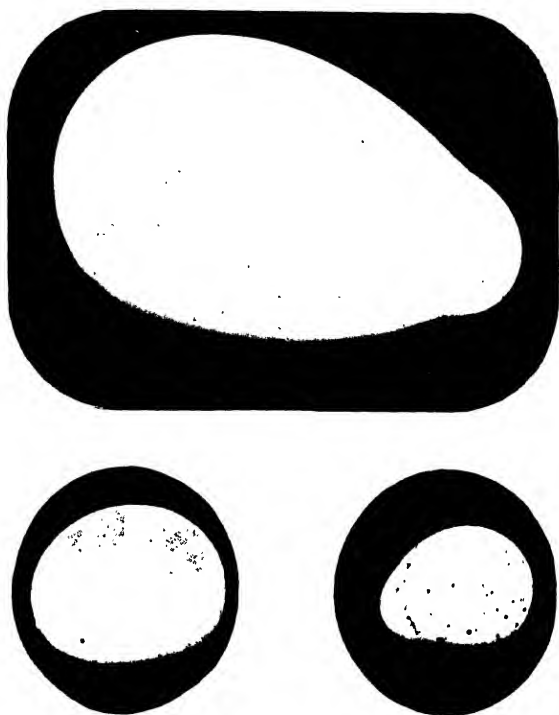
the same as that in vogue amongst his cousins in their native jungles.

Not many of us, I trow, stop to consider, when hunger lends enchantment to the view of the plump roast fowl which is set before us in a lordly dish, the stages through which that bird has passed before he was considered worthy to grace his master's table, and more especially the earlier chapters in the story of his little career!

The curtain (represented by the soft feathers of his proud parent) rises as his mother deposits the cradle of polished ivory, in which he lies snugly encased, upon the floor of her nest with a thump, followed by much cachination and exuberance of spirit. In her wild state the hen is essentially a ground-bird, seldom mounting the trees except at bed-time when she flies up to roost—although her wings are certainly a far more potent factor than is the case with the majority of our domestic birds—therefore her nest is hollowed out in the ground, something after the fashion of our own partridges and pheasants; so that—granted the substitution of a nest-box for the hollow in the ground—there is no material difference between the performance enacted by the wild and the domesticated mother-bird.

We left the jubilant parent clucking with a maternal pride upon the arrival of her young one. Now what does she do with him? Eats him, sometimes! Though, if ever I have a hen that shows a predilection for this form of infanticide, I promptly confront her with a bogus egg which I have previously filled with extra strong mustard! The hen goes for it with avidity, but the resulting discomfort in her throat "puts her off" eggs in future—at any

rate as a form of diet ! The well-behaved hen leaves her new possession to himself, and goes off to play the fool with her friends all day. If the spirit move her, she will lay another egg on the next day, and



Two eggs laid by the same hen, and Thrush's egg ; showing that the latter is very little smaller than the lesser hen's egg.

continue the proceeding, with perhaps a day or two in between every now and then, until she thinks she has got a sufficient number to warrant her indulgence in a prolonged rest.

One of my Tufted Houdans laid a couple of eggs in the same day not long ago, and she was so puffed up in consequence that there was no going near her! But, as a general rule, "one day, one egg" is the motto of the ordinary self-respecting hen, though there are extraordinary stories on record of enterprising birds which have laid two or even three eggs in a single day. I saw a letter in one of the papers not long ago, which recounted the case of a marvellous hen having laid *four* eggs during twenty-four hours; but I should fancy that in this case the proverbial grain of salt would be equally necessary to make either the story or the eggs palatable!

One sees strange freaks in the matter of eggs sometimes. I reproduce here a photograph of two eggs laid by the same hen—one (the illustration of which is rather smaller than its actual size) weighing four ounces and containing three yolks, whereas the other specimen did not even turn the scale at half an ounce, and in fact is very little larger than the thrush's egg beside it, being furthermore destitute of any pretence to a yolk.

But our little friend in the egg-shell cradle—what of him? (My readers will not misunderstand me when I make use of the personal pronoun in speaking of the contents of the egg at this early stage; for the *essence* of "him" is there right enough, contained in the wonderful life-germ, although the contents of the egg at present bear no more resemblance to a chicken than can be found in a pot of apricot jam.) Well, he lies there happily, until his mother has provided him with some sixteen or seventeen companions; for I have noticed that, when hens are left to themselves, or "steal a nest," as it is termed,

they usually lay considerably more than the traditional baker's dozen before they consider they have got a sufficiently large family to make it worth while sitting upon them--necessitating, as it does, a temporary retirement from the many allurements of the world, the flesh and the —, though perhaps the last member of the trio does not attack hens!

Now what is still more curious is that the first laid of those eggs will hatch out subsequently at the same time as the others, although it may have been in the nest as much as three weeks longer than the last one; the reason of this being, that every time the hen comes on to her nest again to lay, she will stay on it a period of a quarter or half an hour, thus warming the eggs already laid just enough to stir the life-germ within them, but not long enough to rouse it into such activity as would endanger it when the egg got cold again. It is a wonderful thing, this life-germ. It is present directly the egg comes into being, although it remains practically inert until the egg has been sat upon for some eight hours or so. Then it springs into action, and its living pulsations become stronger every day; but after the machinery has once got into full swing, if the egg be left cold for too long the vital main-spring will stop, never to stir again.

I have seen this process beautifully illustrated at the Oxford University Museum at one of the Triennial Conversazioni, where the exhibitor had on view several basins of warm water, each containing the contents of an egg-shell (carefully taken out from its covering) at different stages of incubation, showing how the life-germ begins to beat a very few hours after the egg has been sat upon, and how it throbs

22 JOTTINGS FROM THE FARMYARD

with increasing vigour as each successive day passes. And there they were, and no mistake! And the delighted spectators could see before their very eyes the tiny "hearts" beating away like so many miniature pendulums.

I once met a fanatical individual who cherished a creed which forbade its devotees to eat anything which necessitated the taking of life—I do not apply the epithet to the creed, but to the individual referred to—and I could not help thinking of him, as I



Fig. 1.

watched the palpitating throb, throb of those tiny yet perfect atoms, and it occurred to me that it was just as well that the gentleman was not present also, else it would assuredly have spoiled his appetite for the two or three boiled eggs with which he was often wont to regale himself at breakfast.

Let us now consider our little friend when he is ready to exhibit his outward and visible person to the world, and to burst the bonds which have hitherto bound him in enforced seclusion.

It is very interesting to notice the compact manner

in which the chicken's delicate frame is tucked away inside its brittle case. Fig. 1 shows an egg with the side broken away, in order that the position of the lodger just before emergence may be better understood; and the comparatively absurd size of the foot at this stage is very remarkable. The neck is curled round in such a manner that the head comes just to the right of the foot visible in the photograph, the beak being turned upwards and ready for action. In the fulness of time the little head jerks forwards, and the beak deals a resounding blow upon the wall of the shell; and the miniature fusillade is repeated at intervals until we have the result shown in Fig. 2, where a crack is plainly discernible inside the ring which I have made with a pencil in order to show the exact locality.

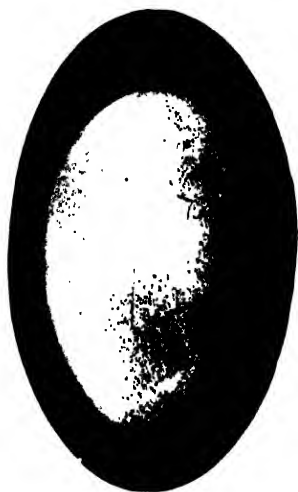


Fig. 2.

This and the four following photographs were taken from the same egg at intervals of about an hour, and I fetched it backwards and forwards to my studio for the purpose from under the hen in charge. This worthy lady, who was already beginning to experience a glow of mingled satisfaction and astonishment at the sound of strange "cheeps" which were proceeding in full force from beneath her downy person—from

the little creatures struggling within to free themselves from their hard encasement—exhibited considerable annoyance at the unwarrantable intrusion upon her privacy, and she forthwith said so in no measured terms, and in language that was utterly unprintable.

A shocking example for her callow brood, that the



Fig. 3.



Fig. 4.

first sound they hear should be that of such unlady-like expletives! But I suppose that she felt herself justified in expressing herself freely at an interruption that must have appeared to her quite uncalled-for. She made no objection, she affirmed, to my fooling around at feeding-time, and she was ready to admit that a pleasant handful of corn was some consolation for the peremptory manner in which she was turned off her warm nest on these occasions; yet she had

no hesitation in describing it as a distinct breach of etiquette to disturb her meditations during any other part of the day, and more especially when her limited intelligence was at present taxed to the utmost in the attempted solution of the strange problem beneath her ample breast !

However, she had to put up with this further indignity ; and ere the egg was replaced for the last time, with profuse apologies on my part for troubling her so often, she was almost courteous in her bearing towards the intruder, while her language had well-nigh lost its element of Billingsgate and become more or less parliamentary. I think it must have been my fingers that bothered her mind. And I am not surprised, for I have often thought that the human fingers



Fig. 5.

must appear quite an anomaly to the members of the lower animal creation until they get used to them ; and surely it is only natural that they should wonder why we have no fur or feathers upon these skinny appendages, for they must undoubtedly look upon our clothes as a form of one of these commodities. That the birds do notice them I have proved beyond doubt ; for I have a pen of very tame tufted Houdan hens, which have become more than

accustomed to the featherless appearance of my fingers,—since they have fed out of my hands from the earliest days of their chickenhood, even jumping on to my wrist as soon as I appear, in their eagerness for some dainty morsel,—with the exception of one eccentric person who nurtures an undying animosity towards the small button at the end of my coat-sleeve, and, heedless of corn or breadcrumbs, “goes



Fig. 6.

for” her pet aversion with a degree of concentrated ferocity which is positively comical.

Now one day it was very cold, and I went in to the hens with a pair of ordinary dark woollen gloves on. The expectant throng rushed upon me as usual, but the moment they saw that my hands had apparently grown feathers or fur, an abrupt halt was called, followed by a stampede to the opposite corner of the enclosure ; and when I hastily removed the offending objects, the birds speedily recovered their equilibrium.

The egg before us, by the way, was laid by one of these pretty hens, as the inscription of "H. 30"—plainly seen in the photograph—testifies, representing the bird's initial and the day of the month on which the egg was laid.

Fig. 3 shows us that the prisoner has succeeded in letting in the first glimpse of daylight ; and in Fig. 4 his still further progress towards freedom is evident,



Fig. 7. How a chicken does *not* come out !
(From an advertisement).

his beak being clearly visible inside the extreme right of the aperture. It is curious to notice the manner in which the chicken works all the way round the shell, until the top of the egg eventually comes clean off, just as it does when we take the cap off a boiled egg before eating it at breakfast, only a little lower down.

In Fig. 5 we see him nearly out, his beak and portions of limbs appearing through the opening ; and Fig. 6 shows his empty case, just as it appeared

28 JOTTINGS FROM THE FARMYARD

when I took it away, after his fat little body had snuggled in under the maternal feather-bed!

I take this opportunity of pointing out the absurdity of some of the representations of a chicken coming out of the egg which are to be found from time to time in pictures or advertisements, and many of which are so grotesque that—like the spotted horse in the circus—they “must be seen to be believed!” I have



Fig. 8. Just out.
The reality (alive).

been permitted to photograph one of these curious illustrations, and here produce it as a striking example of how a chicken does NOT come out! My readers will notice in Fig. 7 the beautiful fluffy chicken, covered with velvet down, which is represented as stepping triumphantly from the egg-shell, having apparently made his exit through a hole which would have scarcely admitted his head; a very ethereal chicken he looks, as he stands on end like a penguin, giving

the impression that he is just about to soar heavenward and leave the contemptible earth behind him !

Another chicken, nearest the foreground, with a well-developed double chin, has got his head out, and appears to have permanently stuck there ; while his *blasé* demeanour betokens that he is either more utterly sick of the world than his more forward brother, or else has been dining "not wisely but too



Fig. 9. Eight hours (dead).

well." A third specimen seems to be trying its utmost to dislocate its neck, while the inhabitants of two other eggs have evidently already soared aloft to the fair realms above— unless they have been caught by the rats—for there is no sign of them anywhere ! Where their mother is, history does not relate ; but I should imagine she must have gone off to have a drink, and totally forgotten her babies ; at any rate, let us hope that she is in blissful ignorance of their most unorthodox behaviour !



Fig. 10. Eight hours.



Fig. 11. One day.



Fig. 12. Two days.



Fig. 13. Three days.



Fig. 14. Four days.



Fig. 15. Five days.



Fig. 16. Six days.



Fig. 17. Seven days.



Fig. 18. Eight days.



Fig. 19. Ten days.



Fig. 20. Twelve days.



Fig. 21. Two weeks.

Now, if we want to see what the chicken *really* looks like when he comes out of the egg, let us turn to Fig. 8. He is not dead, although no one could be blamed for thinking so. He is, indeed, a miserable, bedraggled creature, and one which Mr. Mantalini might have aptly described as a "damp, moist, unpleasant body." Nevertheless, for all its present appearance, the chicken in Fig. 8 is the same one as that depicted in all the other figures of this series. It is astonishing what power of recovery there is in a



Fig. 22. Three weeks.

chicken at this age. I have sometimes picked up one which the hen had thrown out from the nest for some reason best known to herself, and which has betrayed not the faintest sign of movement or life; but after being tucked in far under the warm body of the hen for

a few hours, the infant has completely recovered.

However, it is about eight hours before he reaches the condition shown in Fig. 9, and some twenty-four hours or so before he is strong on his legs and able to sport around his nurse with his brothers and sisters, as we see him doing in the illustration at the head of this chapter. The chick in Fig. 9 is a *dead* one, the stupid hen having made a sandwich of it with her clumsy feet; but, from its inert condition, it is the more suitable for giving a life-size view of the shape and featherless nature of the wing at this stage, which

I have stretched out for the purpose. Our *living* friend is depicted at the same age in Fig. 10. I may mention that this and the remaining pictures of this series are one-third natural size.

I must also explain that the apparent inconsistency in the size of some of the figures—such as the larger size at three days than four days; or, in Fig. 19, where a black feather has made its appearance, but has been



Fig. 23. Four weeks.

grown over again by the time the subject appears in Fig. 21—is entirely owing to the position assumed by the chicken; and such incongruities are easily accounted for by the mood that the chicken may have happened to be in at the time; the main object of the series being to illustrate the progress of the feathers.

When the chick is a day old, the tiny feathers begin to sprout, and we can just see their first appearance

in the wing as shown in Fig. 11. Then they go ahead with amazing rapidity, as will be seen from the photographs taken on the seven following days, until he possesses quite respectable little wings; these give him a very incongruous appearance, as the rest of his body remains entirely devoid of feathers, being clothed in nothing but the fluffy down with which he was born, except a few small sprouts in the tail, which



Fig. 24. Five weeks

make their appearance when he is nearly a week old. This tail he sticks up in a ridiculously pert fashion, if he is feeling happy, as in Fig. 21; but if he is inclined to be sulky, as in the three following figures, no dog with his tail between his legs could well look more dejected!

The cause of this melancholy lies in the fact that at the age of about three weeks the chicken begins to feel very queer; and if the weather is bad at this time, he gets mopy, and stands about by himself wearing

a woe-begone expression. He must be looked after now, as his queer behaviour indicates that his body-feathers are beginning to grow, and this is a period which proves fatal to many chickens if they are not well cared for at the time.



Fig. 25. Six weeks.

In Fig. 23 we see the head-feathers making a start, and the chicken's body now gets rapidly covered until, in Fig. 25, our little friend is quite decently clothed.

The bird from which I took this series of photographs was a delightfully tame little creature, and made no objection to my catching it, but even seemed

to experience great pleasure in sitting upon my hand, in which position I have succeeded in photographing it, as will be seen in the illustration at the end of this chapter. My chief difficulty in obtaining its likeness was owing to the little creature's delight when it discovered the signet ring on my fourth finger. And it *would* endeavour to gratify its overwhelming curiosity as to the nature of the glittering object which it took to be part of my hand ; so that it was no easy task to



Fig. 26. Ten weeks.

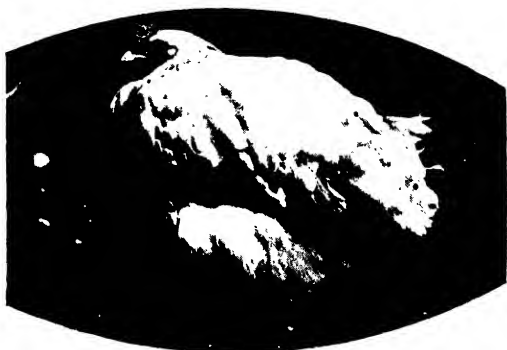
persuade it to give its undivided attention to the camera, especially when I had only one hand at liberty to manipulate the instrument and at the same time to keep the sitter in order ! Its parents are a White Leghorn cock and a Houdan pullet, both pure-bred and very handsome fowls ; and this parentage accounts for the tuft on the chicken's head, which would not, of course, be present in one of the ordinary breeds.

In Fig. 26 we see the chicken's comb well on the way, by which time he is ten weeks old, and has developed such overwhelming bashfulness that nothing will induce him to stand up straight on the operating table, and he firmly insists on literally "sitting" for his portrait.

Here let us leave him. He is at present making violent love to a large yellow lady who must be at least seventeen times his own age, and I shall soon have to transport him from the glorious freedom of our big poultry-run to the small enclosure where I keep what a young lady friend calls "the doomed ones"; and surely sentiment forbids that we should follow him any further!



"Guess I like this seat."



"Jolly cold, eh?"

CHAPTER II

"HATCHING"

WITH the exception of those who are "in the know," few, I believe, are aware of the immense amount of entertainment to be derived from a few minutes spent in the company of the homely fowl; and the members of the poultry-yard are apt to be regarded as "such common things"—just because we are accustomed to behold them in a form of grained parody upon our tables, or still more unrecognisable beneath a smothering disfigurement of white sauce! It is natural, of course, that we should look upon the poor things in this condition as merely a certain form of meat; but don't let us draw the line there, for we should assuredly be enchanted with the varied studies of character which are to be found among these feathered benefactors of the human race, if we were to pay an occasional visit to the small people in their own homes.

The absurd mannerisms, the methodical scratching motion which is intended to uproot the delectable worm, and the expression of astonishment if nothing comes to the surface ; the family tiffs, and the drastic methods by which the old cock separates the combatants ; the courting and being courted, including the romantic attachment of a juvenile cockerel for an ancient hen ; the determined rivalry for the proud position of Cock of the Roost, frequently only terminating as the life-blood flows from the body of the vanquished, while the hoarse clarion of the victor — himself barely able to stand—peals forth over the prostrate form ; the continual sparring that goes on among the gay young sparks, varied by the merciless bullying of the younger brethren, or the shameless persecution of some crippled weakling ; the incessant bickering of the young ladies, as they vie who shall most find favour in the eyes of the Champion Rooster, will in themselves afford us many a hearty laugh.

Then, again, the variety of conversation we shall hear. Many people think that a cock crows and a hen cackles, and that that is about all they can do ; and if you ask them to imitate either one or the other, they will emit a certain weird sound for the cock, and another weirder sound for the hen, but always after the same stereotyped pattern. I once heard a comic individual at some entertainment announce his intention of imitating a hen. The result was magnificent, but it was only *one* of the countless utterances in the vocabulary of that bird that he could reproduce, and he was quite annoyed when I suggested afterwards that he should go out and listen to a hen some day. There is just as much difference, moreover, between the voices of the various

members of the feathered family in the chicken-run as there is amongst the human family within the house, whose table they are destined to serve; and the many inflections in the tones of the former show as subtle a distinction as ever proceeded from the children in the nursery upstairs.

Watch an ordinary hen. The mechanical chatter, irritating in its monotonous incessancy, which she keeps up when she is considering the advisability of laying an egg, is quite another thing from the falsetto shriek of triumph which announces the successful accomplishment of that operation; the note of concentrated terror caused by the sudden descent of half a brick within an inch of her nose is totally different to the exclamation of alarm with which she endeavours to warn her friends that she has just noticed quite the biggest rat in the world strolling across the poultry-run; and distinct, again, from the yell of mingled rage and astonishment with which she would greet the appearance of human fingers intruding upon her privacy in the nesting-box. Then the oft-repeated melodious gurgle of satisfaction with which she answers the longed-for "cheep-cheep" of baby voices and the sharp crack of the egg-shells beneath her, or the subsequent tranquil crooning with which she hushes off her brood for the night; the excited summons when she finds them a fat worm in the paddock, or the imperious command if she should spy a cat in the vicinity.

We are ready enough to concede to the nightingale, the robin, or the wren their respective rich variety of notes, but we are too apt to forget that the poor despised fowl is not merely an automatic laying-machine, from which, when you put corn in the slot,

an egg rolls out, with one set, unalterable, discordant utterance for every occasion.

We owe a great deal to the poor fowl. The next time we sit down to a good dinner, just let us allow our meditative eye to wander receptively over the various items of the courses, and we shall find that—even if her actual flesh is not included in the menu—it will be from but few of the dishes that some portion of her egg is absent, and is frequently the most prominent ingredient. There is a celebrated cake—Snow Cake, I think, is its name—which takes twenty eggs! Think of that! Nearly a month's work for some poor hen!

But it is not from feelings of gratitude that I beg to draw attention, in this chapter, to these interesting creatures, but because of the immense amount of entertainment that can be derived from an occasional visit to the barndoor fowl in the bosom of her family.

There is, moreover, a great fascination to be found in the hatching of chickens; as well as profit, if it be done on scientific methods. Personally, I am old-fashioned enough to prefer the services of natural nurses to the mechanical efforts of “foster-mothers” and incubators; my chief reason being that the former are such a saving of time and trouble, if managed methodically; and as to the success, surely the proof of the pudding is in the eating, for it is on the rarest occasions that I get less than eleven chickens in a brood, while I have frequently obtained as many as fourteen healthy birds in one sitting; my record being reached one morning when two hens produced thirty chickens between them—the one, a huge Buff Orpington, bringing off sixteen chicks

from seventeen eggs, and the other, a Langshan, producing fourteen out of as many eggs ; all of which proved to be strong and healthy chicks !

The accompanying illustration shows the Buff Orpington in question enjoying a dustbath ; while standing by her side is a Houdan, the mother of the chicken whose life-history we followed in the last chapter.



Tufted Houdan and Buff Orpington.

But, by way of contrast, the next lady, who came off two days later, made it a point of honour to squash each chicken as soon as it came out ! She sat beautifully close, and in fact brought out the whole brood a day before they were due ; but she watched for each ill-fated babe, as it came out, and promptly slew it ! The fiendish expression in her eye inclined me to the opinion that she must have been mad. However, had she entertained any idea of entering the culinary profession, her forte would certainly have been pancakes, judging from the complete success with which she flattened those unfortunate chickens !

Some of my friends—business men, who spend their day in the City—when they see my numerous broods of still more numerous chickens, endeavour to soothe their envious feelings with the remark that I “must spend the whole day attending to

them"; and they look incredulous when I assure them that just one quarter of an hour every morning is all the attention that my sitting hens get from me, and no other than myself has a finger in the pie!

Given a fair start—*i.e.* with proper accommodation at the outset, after a judicious selection of good stock — and success is certain to follow upon regularity in the "treatment of the subjects," and method applied upon scientific principles. The selection of stock is a very important point, as we cannot get good chickens from bad or indifferent eggs.

(My readers will, I am sure, pardon me for introducing a few hints upon this subject; but I so constantly hear pitiable



In the sulks.

stories of "one chicken out of the whole sitting, and that was taken by a rat," and such like tales of woe, that perhaps a few ideas from one who has been successful in this line—from a purely amateur point of view—might not come amiss to many who would fain experience more fortunate results with their chickens; and I trust that some of my readers, at any rate, may find a few gleanings which will prove of use to them.)



"Ain't I a pretty girl!"



Contemplation.

"Always find I can think best on one leg."



"Keep your distance!"



Nothing like a good bask in the sun!"



"I prefer the shade: so much cooler!"

The Cock of the Roost and some of his wives.

In the first place, then, I constructed a rat-proof enclosure for the accommodation of the sitting hens, of half-inch wire netting the whole way round, except the back, which was already formed by a stone wall. This enclosure is high enough to stand up in, and some twenty feet long by eight wide; while corrugated iron sheets, placed side by side along the roof, keep the place thoroughly dry. The length of the enclosure can of course be regulated by the number of hens that one may want to have sitting at the same time.

It took no longer than an entire Bank Holiday to erect the place single-handed; and, once made, it will of course practically last for ever, the result more than justifying the initial



"Empty! what a fraud!"

expenditure on material. In ten minutes a rough coop with a removable door can be easily knocked together by any one with a penchant for carpentering—any old box or packing-case being admirably suitable.

The coops are placed in a row, all along the wall; and between each is a wire partition three feet high, allowing a separate run of about two feet wide for each hen, when she comes off to feed. It is very important to thus keep the birds apart, preventing much confusion, as well as any attempts to go back into the wrong nest. Stepping-stones (composed of sections of a large tree-trunk sawn asunder) enable

me to step over the partitions with comfort, and it does not usually occur to a well-regulated hen to attempt to get over too. Early every morning I go through the enclosure and turn all the hens off to feed, throwing down a handful of corn into each run, and every other day sprinkling a little warm water over the eggs; and after ten minutes or a quarter of an hour the birds are gently sent back again to their nests, and there shut in.



"Who spoke to
you?"

The nests are made with clean earth covered with hay.

When a hen shows that she wants to sit, I put her at once into one of the coops, upon dummy eggs; she can peck at these till she is black in the face, if she is riotous and so inclined—for hens are often a bit wild at first, and inclined to resent being shut in—but that will not matter; and when she finds that she can make no impression on the hard objects, she will soon give it up. But not until she has been there for three or four days, and has thoroughly settled down, may she be trusted with real eggs; her behaviour during the daily outings serving as a criterion as to whether she is ready to receive them.

Two golden rules, upon which I believe a great measure of success depends, are these: see that the door in front of each coop fits well, so that the hen can be practically shut into pitch darkness directly she returns to her nest (a few holes or cracks in the top of the coop will afford sufficient ventilation).

Secondly, look in quietly, when she has been on the eggs for two or three minutes, to see that she is covering them all properly, pushing gently underneath her any that are visible; for the best of hens will occasionally kick an egg to one side unintentionally as she gets in, and it would be found the next morning, lying in a corner of the coop, cold and lifeless, unless some such precaution were taken. Also bear in mind that the fresher the eggs are when put under the hen, the healthier will be the chickens resulting therefrom.

This is not meant to be a treatise on poultry, so I will now forbear; but if these few hints should prove of service to any who may read them, their introduction will be pardonable.

I have included in this chapter a few snapshots of some of the quaint occupants of my poultry-yard, which perhaps may prove of interest. The photograph entitled "Caught Napping" is quite remarkable, it being most unusual for a hen to assume this position in broad daylight.



Caught napping.



Two of the "Leaf" butterflies which imitate dead leaves.

PART II

THE LIFE OF A MOTH

INTRODUCTION

I WILL now solicit the attention of my readers for a time while we discuss the nursery days of a most interesting branch of insect life—the moths and butterflies, "Scaly Wings," as their family name of "Lepidoptera" signifies, from the fact that, their wings are clothed with scales, layer upon layer, overlapping like the tiles upon the roof of a house.

If you will gently rub one of such wings with your finger, and then examine it with the help of a pocket

lens, you will see that the result is identical with that produced by a violent storm upon the roof of a barn ; for scores of the delicate little "tiles" will have been removed, leaving ugly gaps behind them, which, though perhaps scarcely noticeable to the naked eye, look very bad when viewed under the glass. If you will also apply the lens to your finger, you will see that it is coated with an iridescent mass of the tiny specks that have been brushed off from the wing.

Each one of these minute atoms is in itself an exquisite object ; and although, individually, they are little more than just visible, yet, in combination, they produce the lovely effect that gladdens our eyes as we gaze at the beautiful pinions of the butterfly, just as the flowers on the side of a Swiss mountain combine to produce such a rich glow of colour in varied shades.

These microscopic "tiles" are of many shapes, some of them being long and slender like a paper-knife ; others may be short and broad like a copybook ; while others again are like a tennis-racquet with a short handle, by which they are attached to their place on the wing. They are fixed on the wings of certain butterflies in such a manner as to appear a different colour when seen from another point of view ; and this arrangement gives the marvellous "shot" effect that we see in the wing of the Purple Emperor butterfly, reminding one of a glorified edition of the parasols at Henley Regatta—if such a simile be permitted.

This wonderful iridescence really constitutes a powerful means of protection to its owner—although it would at first sight appear otherwise—as I will show by quoting a few words from a paper by Mr. A. H. Thayer, read before the Entomological Society of London.

Mr. Thayer takes the instance of the wild peacock --the *bird*, not the butterfly--whose iridescent splendours are a common feature of the jungles in its native land : " Let us imagine an animal stalking this bird. He will look *wholly for motion* (such, at least, is the habit of all the predatory creatures I know). Now it is the peculiar property of sheen that it will *stand still* while the thing it is on moves. This means that a peacock can move his brilliant neck while its sheen *stands still*, just as the gleam on the telegraph wires keeps pace with the railway train, as one sees it from the window. And since this gleam of the bird's neck must be the most visible thing, the possibility of the neck's gliding along *behind* it, while it *stands still*, must often save the peacock (for the balance between the *evolved skill of the hunter* and the *evolved skill of the hunted* must always be close, and the smallest advantages must often tip the scale). While the fore part of the bird is beginning to move unnoticed, his conspicuous tail, a yard behind his vital parts, catches the tiger's eye in its earliest motion, and the tiger, seeing no other part so distinctly, springs at these long feathers, whose design is arranged for *conspicuousness in motion*."

The same theory applies equally to a butterfly whose wings are adorned with an iridescent sheen of any kind ; and we can quite imagine how a bird, or some such foe, might be successfully baffled, when pouncing at the butterfly, by the bewildering ambiguity of the latter's plumage. The accompanying photographs of a pinned specimen of the Purple Emperor, taken from slightly different points of view, show very clearly the effect produced by this sheen when the insect moves its wing so that the light



Purple Emperor Butterfly.

Showing the effect of the sheen on the wings, when taken from different points of view.

strikes it at a different angle, the markings of the left wings in the illustration being practically obliterated, and giving the appearance of an almost transparent surface!

It is not my intention in this volume to describe the various ways in which Nature *protects* the butterfly or her babies from the countless enemies that are always ready to attack their nursery, as I have done this at considerable length in *Nature's Riddles*, with many illustrations to show how the protective nature of their colouring is beneficial to them in all their stages; and, as there is no occasion to repeat myself here, I will be content with merely introducing a few more photographs of similar cases which were not included in that volume, a couple of the wonderful "Leaf" butterflies being shown at the head of this introduction, and the caterpillar of the Orange-tip butterfly at the end; while a few more will be found further on. The chief object which led me to undertake the compilation of this work was the desire to place before my readers the series of photographs representing the stages in the expansion of a butterfly's wings which are reproduced in Chapter III.

Most of us are aware that the ordinary moth or butterfly possesses four wings, which it uses as a means of locomotion; but comparatively few realise the marvellous process by which those wings came there, and how long they took to reach maturity.

Take, for example, the Red Admiral butterfly, which makes his appearance in the months of August or September, and gladdens our eyes with his superb plumage as he waltzes with his lady-love amongst the flowers. Watch him as he hovers around a blossom

of the red Valerian—his favourite flower—or a tall, majestic Marguerite; mark the exquisite grace of the effortless swoop with which he floats on to another blossom, or dives his long proboscis down each delicate cup to sample the sweets that lie hidden within; or anon, when the fancy takes him, how he spreads his brilliant wings and soars majestically over yonder oak tree!

Not many weeks have passed since his regal beauty lay in the dingy depths of a wayside ditch, concealed within the sombre folds of a nettle leaf, which he had curled around his caterpillar form in order to protect himself from the attacks of marauders. What magic touch could have transformed the lowly grub into that vision of loveliness that breaks the sunbeams into rainbow patterns as he whirls about our heads, or what power enables him to set at defiance the laws of gravitation as he even matches the splendid vigour of his flashing pinions with the keen blast that sways the tree-tops?

Or the exquisite moth, whose life-history I have briefly illustrated on the next page? There is a wide difference between his appearance as he clambers laboriously up the stalk in Fig. 1—looking, by the way, for all the world like a diminutive Polar bear!—and again as he sits on the same stalk in Fig. 2, gorgeous in a dress of rainbow colours, exquisitely blended beneath a glossy sheen. It is curious to notice the posture assumed by this moth when resting, as he hangs by his two front legs, stretching them out to their fullest extent, in which attitude he gives the impression of trying to push the stalk away from him! During the interval his form has lain concealed under a leaf, wrapped in a cocoon of the most exquisite

silk, like spun gold. Fig. 3 shows the hammock constructed by this accomplished caterpillar; and in Fig. 4 we see it in its natural position, hidden beneath the leaf.

I remember once reading a pretty story about a little girl who espied a caterpillar crawling about on a path, when she was playing in the garden, one summer afternoon. At first she was rather afraid of approaching the strange creature, and gazed at him for a moment from a respectful distance; and her feelings were not unmingled with awe as she watched him wobbling over the gravel, and picking his way gingerly among the little stones that occasionally obstructed his progress.

Now, her soul had longed for some sort of pet ever since the day when her beloved kitten had died from the effects of indigestion, doubtless brought on by a disgraceful over-indulgence in a diet of "daddy-long-legs," spiders and blackbeetles. She wanted something that she could confide in, and into whose sympathetic ears she could pour out her baby troubles. Who does not remember experiencing just such feelings in his childish days! When I was a small boy, I once made a pet of a large centipede, which I kept for upwards of nine months in a match-box, in company with a bottle-shaped spider and a wood-louse; and I am sure that this incongruous trio knew more of my heart's desires than any man, woman, or child before or since!

As far as I can remember, I fed these strange pets on cake-crumbs and sugar, which the centipede and wood-louse used to devour with avidity; but what the spider lived upon I have not the least idea, unless the cravings of the inner spider, and the lack of



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

Life-history of *Plusia moneta*.

anything in the fly department, forced him to partake of the common board. I was secretly in awe of the last member of the community—though I never would have admitted the soft impeachment—and that gentleman's powers of locomotion were so rapid, and his movements so altogether unexpected, that I was fain to open the box very cautiously until I had ascertained what frame of mind he might be in !

The wood-louse was of a more bashful disposition ; in fact, he possessed such a retiring nature that he would roll up into a black, shiny ball at the slightest provocation ; while the centipede suffered from fits of depression, and would also sulk frequently. The spider, consequently, was usually left at home when it was time for exercise—unless I could have the monopoly of the whole schoolroom table—and I thus got out of the difficulty of having to restrain his wild rush for liberty !

But to return to the story.

Here, ready to hand, was the confidante that our little friend wanted. Moreover, she was a soldier's child, and inherited her father's martial spirit ; so that it would indeed be disgraceful if she were to be afraid of a mere caterpillar, when her noble father had met a hero's death in the service of his King and country !

Accordingly, plucking up her courage, she stretched out a finger in front of the crawling creature, not without a certain feeling of repulsion, and a little thrill as she felt his clammy body rolling over her hand ; but when she found that the insect showed no desire to swallow or even to bite her, but, on the contrary, evinced an increasing anxiety to escape, she carried him indoors in triumph.

There she deposited him in a flower-pot, on the

nursery window-sill, together with some leaves which she had gathered at random; for she had a dim notion that caterpillars would eat leaves, just as I had that the centipede would eat cake-crumbs; and she thought that the poor little thing must evidently be hungry after his long walk.

On coming downstairs the next morning, her first thought was to visit her new *protégé*, and tell into his sympathetic ears how terribly Nurse had pulled her hair with that dreadful comb. Picture her dismay at the discovery that her treasure had disappeared! Not a trace of him could be seen, and neither had a leaf been touched! Supposing that he would surely come back when he felt hungry, the little maiden put some fresh leaves into the pot, and allowed it to remain uncovered for a few days, and then, when no sign of the truant appeared, she searched in the earth at the bottom of the pot. There, to her surprise, she discovered a funny brown, dirty-looking object, which at first she could not make out at all, but at length decided that it must somehow be the shrivelled corpse of her would-be friend and companion.

It looked rather like a little chocolate sweetmeat, she thought, and showed it to her younger brother, who was evidently much struck with the resemblance, and manifested an unrestrainable desire to taste it! But no! her darling should have at least an honourable burial, and it was therefore duly replaced in the pot, with a small piece of stick, by way of tombstone—and I quite expect that a tear or two were shed at the ceremony and there he lay well-nigh forgotten through the long winter days.

Up to this stage I have seen no occasion to comment upon the degree of probability in a story of which my

somewhat garnished version has effected no alteration of the main points. The little book in which it occurred was considerably over a hundred years old when I found it ; and the general shaky construction of the subject-matter, as well as the excessively comical nature of the crude illustrations, unconsciously betrayed the fact that the writer had put it together rather for the sake of something to say, than from any marked ability to do so ; moreover, in view of the evident fact that no one in those days possessed even the most rudimentary knowledge of natural history, with the exception of a learned few, we may readily believe that such a story-book would be allowed to pass unchallenged.

But now comes a point to which I do wish to draw attention, inasmuch as in it is embodied a delusion which, even if not to a certain extent prevalent to-day, was undoubtedly, to all intents and purposes, universal among our ancestors of three or four generations ago.

One glorious morning—so runs the story—in the ensuing spring, our little friend perceived a movement in the flower-pot where the caterpillar had been buried. Surprise and curiosity led her to watch for a moment, and she soon had the gratification of beholding the covering of earth cast aside, and a beautiful butterfly appear ! It stood for a minute on the edge of the pot, quivering its exquisite wings—presumably to bow its acknowledgments of the little maiden's kindness in keeping it safe during the winter—and then, like a flash, it was gone, and she saw its face no more !

I rather fancy that the anecdote went on to relate how the butterfly returned one day, when the little lady was standing by the open window, and deposited

some eggs on the plant which had been subsequently put into the pot, and that the writer then proceeded to point some moral about gratitude or something of the sort ; but as I was of a very tender age at the time of reading the story, and all the hunting among the old nursery books has proved unavailing, I cannot be sure of the details of the sequel.

However, I remember that I was much struck at the time with the pretty story, the main facts of which are still vividly imprinted upon my memory, and more especially one marvellous representation of a brilliant crimson moth, such as certainly never yet existed ; and as I was hardly old enough to detect the flaw, there was nothing to mar my satisfaction.



Caterpillars' cradles—Mud *versus* moss.

Now, the first discrepancy lies in the fact that the caterpillar of a butterfly, as distinguished from that of a moth, never by any chance buries itself in the ground when it is ready to turn into a chrysalis, nor would it ever condescend to hide itself in a cocoon such as those shown in the illustration, or of any other



Fig. 1. "Swallow-tail" Chrysalis.



Fig. 2. "Swallow-tail" Chrysalis,
in act of emerging.



Fig. 3. Immediately after emergence.



Fig. 4. Full-grown.



Fig. 5. Empty shell.



Fig. 6. Perfect set specimen.

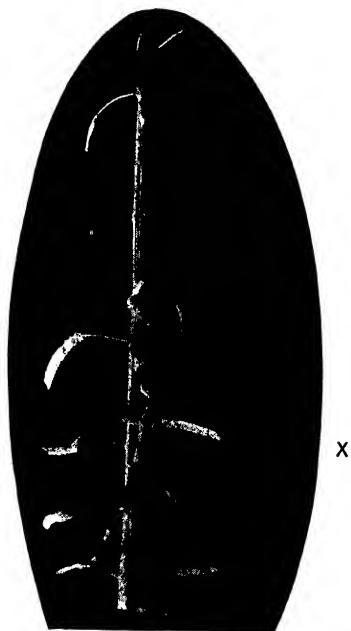
kind, preferring to suspend itself openly upon a stalk or wall.

But an even more important fact is that when a butterfly (or moth) emerges from his chrysalis shell, he is powerless to fly for at least some hours afterwards, for the very satisfactory reason that he has no wings to fly with. In place of the gaudy pinions which we are accustomed to associate with the name of butterfly, there are at first nothing but draggled, stumpy little bits of fluff—more like pieces of wet rag than anything else—hanging from an abnormally fat, repulsive-looking body, which the owner evidently finds a great burden. Nevertheless, if we look at these bedraggled appendages with the aid of a pocket lens we shall see that the whole pattern of the wing is perfect and complete, though, of course, on an infinitely small scale.

This process is briefly illustrated by the accompanying photographs of the Swallow-tail butterfly, showing the chrysalis “before and after”—as the advertisements of hair lotions say—in Figs. 1 and 5 respectively, while the butterfly is depicted in the act of emerging, immediately after, and full-grown in Figs. 2, 3 and 4, and the perfect set specimen is seen in Fig. 6.

But, in order that we may have a better opportunity of following the actual steps of this fascinating process, I have taken a series of photographs, at intervals of a few seconds only, which will be found in Chapter III. However, it seems fitting that before describing the process of expansion of the wings of a moth or butterfly some attention should be paid to the earlier days of the insect, and with this object the next three chapters are arranged

in the form of a *résumé* of the life-history of the moth or butterfly from the outset of its career, leading off with a consideration of the caterpillar days of the Puss Moth.



Caterpillar of Orange-tip Butterfly among seed-pods
of the wild mustard.



The "Puss Cat."

CHAPTER I

"THE PUSS CAT"

I SHOULD undoubtedly offend the caterpillar of the Puss Moth if I did not give him an interview to himself. He is a gentleman worthy of the utmost attention, and he shall certainly have it.

More especially is it my personal wish to keep in his good graces, otherwise his revengeful disposition may lead him to pay me out in the same way as one of his family did once before, owing to which gentle attention I nearly lost the sight of one of my eyes! I will not go into that now, as I have given the story at length in "Nature's Riddles"; and besides, it is not my object here to heap contumely, so much as coals of fire, upon the head of my quondam assailant.

That he is a person of some considerable importance is proved by the fact that I received, about a year ago, a communication from a distinguished Professor in Russia, in which he implored me, in very weird French, to send him a copy of an article which I had written on the subject of this caterpillar, and which I suppose must have somehow found its way into his laboratory (the article, not the caterpillar). I did not remember having written anything worthy of such distinguished attention, but I did my best for him and received in reply another effusion, couched in still more gushing terms and expressed in equally unique French, informing me, amongst other things, that he was sending me by the next mail "a few little things" of his own, and adding that he sincerely trusted that I should "experience much of pleasure" in perusing the works of my "devoted and admiring colleague."

A special postman staggered up to my front door shortly afterwards, laden with bulky volumes which were covered with strange Russian stamps school-boys, don't all speak at once, for I have given them away long ago—and still weirder directions to the postal authorities to use the utmost care in the delivery of the parcels, which, being partly in the same original French as the letters were, and partly in Russian, must have greatly puzzled the officials on this side of the water.

However, there they were; and sheaves of huge paper-covered documents were forthwith poured upon my doorstep; and I gathered them all into my study, in pleasant anticipation of a rare treat in store.

Seating myself in the armchair, I poked the fire,

threw a couple of logs on the blaze, kicked the cat aside—it is a stuffed one, and did not mind—and prepared to enjoy myself. I took off the numerous wrappings, and put on my glasses, and—lo, behold! they were all printed in *Russian*!

Alack! Woe is me! “O poppoi!” as the ancient Greeks used to say, if anything particularly upset them; to which they frequently added “Oimoi!”—this being presumably their national equivalent for “Oh my!” I don’t know any Russian swears, or I would put them in too. The books might at least have been written in Latin, or even bad French, and I would not have grumbled at Greek, but—Russian!

By what cruel decree of a relentless fate was it enacted that I was never taught Russian at school? What a hideous flaw in the educational system of our country!

Let those in authority look to it.

But I am going to retaliate by sending *this* effusion to the learned Professor—in *English*! If he survives, perhaps he will keep the ball rolling by sending me any more “little things” that he may have composed in the meantime; so that I may shortly expect to see another perspiring special postman struggle to the door, and expire with a groan on the mat. Well, it’s good for trade, anyway, as represented by the Post Offices in Russia.

After this introduction—which I think proves irrefutably that the Puss caterpillar is a person of distinction—let us “return to our sheeps,” as the graphic phraseology of our highly metaphorical neighbours across the Channel would put it.

We must not imagine that the Puss caterpillar suddenly springs upon the world in the form that

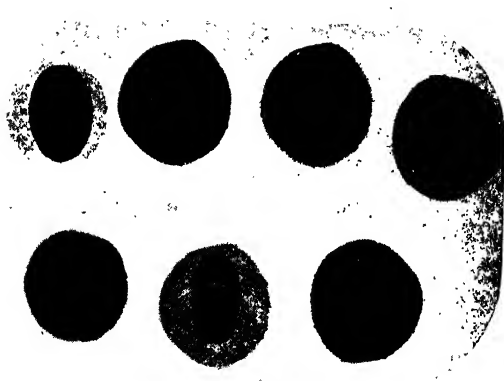


Fig. 1.

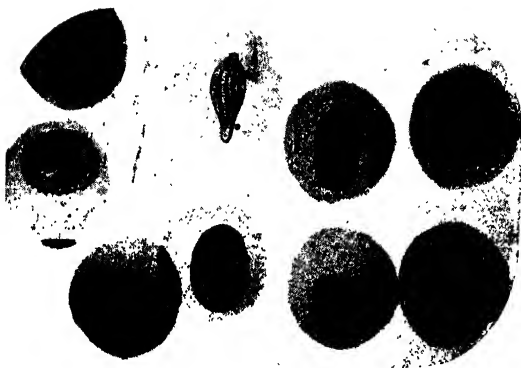


Fig. 2.

Some magnified eggs of moths and butterflies.

(Photographed from plate in Hofmann's "Die Schmetterlinge Europas.")

his name signifies. His first appearance on the stage is made when his fluffy parent deposits him gently, yet firmly—for there is no fear of his falling off when his mother takes the precaution of *glueing* him on—in company with two or three little brothers and sisters, upon the surface of a poplar leaf, each securely encased within a tough eggshell of mahogany hue.

Very different is the shell surrounding an egg of this sort, to that with which the baby bird or chicken is covered, being leathery to a degree, and of a toughness which ensures a good stiff bit of work for the young caterpillar, ere he can bite his way out. I have persuaded a Puss moth to lay a couple of eggs on a piece of white cardboard, in order that their form and size may be the better understood; and upon this surface they stand out in strong relief, as shown in Fig. 1.

I mentioned “glue” just now, and must give a word of explanation for having done so; for herein lies an instance of the remarkable sagacity and forethought of My Lady Puss Moth. “Surely she cannot carry about a portable gum-bottle with her, to glue her eggs on to the leaves?” I hear some one exclaim. But that is precisely what she does! And the habit is greatly to her credit, when we consider the manner in which some of her neighbours scatter their eggs higgledy-piggledy, in hopeless confusion, among the grass and leaves.

The illustration shows how the pretty Vapourer moth is equally careful to fasten her eggs in masses on the outside of her cocoon.

I do not wish to bring this as a charge against such careless parents, for they probably are instructed by their unerring instinct, that this device is best

suitcd to the needs of their offspring, which will prefer to feed upon grass and low herbage, and therefore intentionally fling their eggs broadcast to the winds ; but I maintain that it is not a tidy habit to throw one's eggs about, as if one were sowing seeds ; and that, in the face of such an example, all the more credit redounds to the account of the Puss moth for her tidiness and precision ! Certainly the cares of motherhood are considerably lessened in the case of the little Blue butterfly, who tosses her eggs about anywhere, as if she were sowing a field, paying no further attention to them thenceforth ; but it is quite another story to have to hunt around for a suitable leaf in the first place, and then whisk out one's gum-bottle, with which to fasten each egg on separately, lest the rain should wash it off. I am glad to say, however, that such parents as the Blue butterfly are distinctly in the minority, so we will let them pass.



Cocoon of Vapourer Moth
with eggs laid all over it.

I have introduced, a page or two back, some photographs of magnified eggs of certain butterflies and moths, from one of the excellent plates in Hofmann's work on European Lepidoptera, in order that we may see more clearly the marvellous forms and shapes which they assume.

Capital stuff, too, is the home-made glue of the Puss moth ; and, although the drop which accompanies each egg, as it is laid upon the leaf, is extremely small, it is quite sufficient to fasten the egg so firmly

to the surface that it is often a matter of considerable difficulty to get it away; and one couldn't get the eggs off that little piece of cardboard without some of the paper coming away as well.

The interior also of these eggs is of a totally different nature to that of a bird; there is no semblance of a yolk, and the case is at first entirely filled with a thin greenish fluid.

After a few days the young caterpillar has formed inside, and soon becomes impatient to make his mark



Fig. 1.

in the world. He thereupon begins without delay by making a very decided mark on the wall of his shell by means of the powerful jaws which will serve him in such good stead throughout his future life. Even at this early age his pincer-like "teeth" are strong enough to speedily force a hole through the tough

exterior of the egg; and it is very amusing to watch, with the aid of a pocket lens, the systematic crunch, crunch with which he goes at the tiresome obstruction, followed by a final crash as the last bit gives way, and the breach is large enough to let him out. No need of a dentist in this department, thank you!

Out he marches promptly, with triumphant air, through the gap which he has made in the side, albeit there is no friendly orchestra to accompany him with the strains of "See the conquering hero comes!" Ask him what he has done with the bits, for there are no fragments of egg-shell lying around. "Eaten them, of course!" would be his astonished reply if

he could speak English ; and, if one's sense of hearing were strong enough, one might gather from the tone of his voice that he was positively aghast at the mere contemplation of any waste of such good material ! He does not eat any more of it, though ; at least, I have never known one of them to do so, and many thousands of them have passed through my hands. Perhaps he is afraid of wearing his teeth out, or pines for a more succulent morsel than his leathery *hors d'œuvre* !

But Master Puss pauses not to survey the wreck of his castle. There is no time for sentiment in the caterpillar world, so he applies himself with vigour to the business in hand. There he is, in Fig. 2, just after he has come out, a narrow little black object, with a huge head out of all proportion to his size, and two tails at the other end. *Two* tails, forsooth ! He is better off, then, than his namesake, the feline Puss cat, which has to be content with *one* of these appendages.



Fig. 2.

The life of a caterpillar is uneventful to the point of boredom. At least it would be to you or me, though I dare say it suits him all right. His family motto is, "Let us eat and sleep, for to-morrow we die," and he certainly lives up to it, conjugating the first two verbs in all their tenses, with a few of his own thrown in ! The "dying" part of the business might be significant of his ultimate change into the chrysalis state, involving a long death-like sleep, which will hold him in its thrall for a period of months.

But stay! there is an event of great importance which recurs occasionally to break the monotony of his dull existence. This is when he *changes his clothes!*

He has here before him an operation of much delicacy, and only to be accomplished with great anguish of mind. It is, moreover, a dangerous process, as is proved by the fact that it will often entail the death of a weakly caterpillar, and always takes two or three days to complete. ("There!" says my wife, who is looking over my shoulder, in a tone of triumph, "you see he takes much longer changing his things than I do, after all!" "Yes," I reply, "but you see *he* only does it four or five times in his whole life, instead of two or three times every . . ."—but she has discreetly retired.)

Now we may wonder why it should be necessary for the caterpillar to change his clothes at all, in view of the utter absence of variety in his existence. Why should not his skin grow continually, and expand in accordance with his increasing bulk? So it does, to the best of its ability, but the curious part about it is that his *head* does not! For, whereas the *skin* is pliable as indiarubber, and will expand to any extent required of it, the *head*, on the contrary, never increases at all in size; and consequently, when the body has outgrown the head, a new specimen of the latter commodity has to be supplied to take its place!

But for this excellent arrangement the caterpillar would always look like a boy I met in the road the other day, with a very small top hat and a suit of Eton clothes which I should think must have belonged to a brother many sizes larger than himself. The caterpillar does, however, present just this appearance

immediately *before* he is going to change, and looks equally absurd directly afterwards, when he comes on the scene with a new head much too big for him !

This simile will be better understood if we compare the portraits of the same caterpillar as given in Figs. 8 and 9. We shall notice that the head (which is seen on the extreme left) *is exactly the same size in both cases*, although in Fig. 8 it is too large, and in Fig. 9 ludicrously too small for the caterpillar.

There seems also to be another object in this periodical change of clothes on the part of the caterpillar, besides that of mere personal comfort ; and, in fact, there is no doubt that he gains a most important advantage with each new change of attire. For, as he increases in size, he naturally becomes more and more conspicuous, and likely to attract the attention of the many enemies that are always ready to make short work of the juicy morsel which his plump body presents, and consequently his only chance of safety is to make himself as invisible as possible ; and this object is admirably effected by the means of his new suits, each of which is coloured after the same pattern as the surroundings amongst which the caterpillar lives.

So we see the reason why, when he is a tiny mite (as in Fig. 2), and too small to be conspicuous, he is attired in plain black from head to foot, and looks as if he were just starting for a funeral ; although, even in this costume, he would not appear *out of place* on a *green* leaf, such as those of the narrow-leaved willow—a tree of which he is particularly fond—for the foliage is always so thickly interlaced with an under layer of slender dead twigs of a very dark hue, that he might well be mistaken for a small scrap broken

off one of them. Then his first change of clothes gives him a faint touch of pale green; and this element increases until his last suit is composed largely of vivid green, broken up by splashes of darker colour, the whole combination affording an excellent imitation of the leaves and twigs of the tree. The effect as produced is shown in the illustration at the head of this article, where a Puss caterpillar is seen resting after a meal, the illusion being further strengthened in this case by the fact that he has left a long "tag" on the remainder of the leaf which he has been eating, which bears a striking resemblance to his own tail!

Caterpillars of certain other species are even more fastidious in their choice of garments, always with this same object in view; and, by the time they become old gentlemen, their clothes bear not the slightest resemblance to those with which they were adorned in the days of their youth, the contrast being just as great as it is between the white frock and blue ribbons of my baby boy, and the frock coat and top hat which he will wear on his wedding-day—though may the Heavens avert that this latter iniquitous article should be still in fashion when the little one reaches man's estate!

A wonderful case in point is that of the beautiful caterpillar of the Emperor moth, which as a youngster is clothed in sober black, at which age he seldom leaves his birthday sprig of heather, and whose tiny form is not easily seen as he crouches beneath the short thick leaves. But his last suit is indeed a revelation, and surely "his own mother wouldn't know him!" For, besides being arrayed in a complete outfit of glorious emerald green, he is further

adorned with rows of bright pink knobs, each surrounded by a fringe of stout dark bristles—an exact imitation of the heather buds with their fringe of thick dark leaves! Thus, when he roams abroad among the heather, or even sleeps openly among the blossoms, he is no more conspicuous in his gaudy dressing-gown than he was before he was short-coated!

I could give a hundred more instances of the kind, but I will forbear, as I have treated the subject at length in the volume I mentioned above, showing how the theory of Protective Colouring is borne out through the length and breadth of the entire animal world. Our business now is with Mr. Puss, and I merely enlarged upon his curious habit of changing his clothes in order to show that this custom is really of the greatest significance, and of such importance to him during his whole career that he is more than justified in running the risks connected with the operation.

Let us turn again to Master Puss in petticoats.

We left him as he appeared in Fig. 2, just out of the egg, and ready to tackle the leaf upon which he is standing. This he does with a will, and to such good purpose that in four days he feels the need of a new head, and accordingly takes up his position as seen in Fig. 3, having previously spun for himself a



Fig. 3. Four days.

small silken carpet, upon which he can take a firmer hold than he could upon a mere stalk or leaf. He waits anxiously for nearly two days without moving

or speaking, while the craving grows hourly more strongly upon him.

At length the crucial moment arrives. Split goes a button at the back of his neck; and he is finally successful, after one of a long series of wriggles, in ripping up his old coat just behind the shoulders. By dint of superhuman exertions, he then rubs off his old head, and walks slowly out of his worn-out clothes, facing the music again in a brand-new, though much



Fig. 4. Six days.
First change.

wrinkled suit of velvet. Occasionally his old head is loth to be turned adrift, and will stick persistently to its master, and further repetition of the wriggles is necessary before it can be dislodged. It is sad to see that His Highness's degraded taste has not improved with his change of costume, for as often as not he will now turn round and eat his old skin! Not till after a long rest, though, for his new head is much too soft to think of anything, and his jaws too tender for the serious business of life until he has sat still for several hours at least.



Fig. 5. Twelve days.

There he is in Fig. 4, after he has had his forty winks. He has just finished demolishing his old coat, and probably feels a little better, and no doubt ravenously hungry; and indeed we must admit that to fast two days, and

then to have to change your skin on an empty stomach, would be a serious tax on the strongest constitution! If you don't think so, try it!

His appetite having been whetted by the paradoxical process of getting outside his old clothes, Master Puss goes for the nearest leaf, and the next few days are again spent in gorging himself to repletion, with periodical naps to sleep off the effects. This continues for another six days, by which

time the young gentleman is beginning to realise that his clothes are again getting hopelessly out of fashion, and that it is high time he paid another visit to his tailor. Fig. 5 shows him accordingly contemplating his second change, being at the time twelve days old.

Another two days of silent meditation, and we see

him in Fig. 6 walking up the stalk in his new Eton suit, preparatory to a meal that would give points to the hungriest schoolboy.

When the sun has set for the twentieth time on the career of Master Puss, we find him bracing up his nerves for a third change, in which position we see him in Fig. 7,

looking, to say the least of it, rather scared at the idea. And he is quite justified in experiencing certain feelings of apprehension at the prospect, for



Fig. 6. Fourteen days.
Second change.



Fig. 7. Twenty days.

this change is one of great importance, and not to be negotiated without much agony of spirit. Hitherto, his general appearance and colouring have varied but little since the days of his infancy, and up to this point the sombreness of his attire has only been broken by the merest suspicion of yellowish green ; but after this change he will have a head which will carry him on to an increase of at least four times his present bulk, by which time he will be a person of quite majestic presence, and also a conspicuous target for the eye of the enemy. So it will be necessary for him to exercise more taste in the choice of his garments, and to rig himself out in the manner in which he will be the least likely to attract hostile attention as he rests or walks abroad among the leaves of his willow bower.

This moment is not unlike that which comes in the life of every schoolboy when he begins to answer to the master's roll-call in the tone of a cracked bell instead of the clear ringing clarion of yore ; when the rough hobbledohoy is merging into the serenier state of early manhood, and he feels it incumbent upon him to fasten his tie with some show of interest, giving a hasty and shamefaced glance at himself in the friendly glass after he has finished dressing of a morning, instead of throwing on his clothes anyhow, and hoping they will stick there somehow until he changes for football.

The importance of this step in the career of the caterpillar is indicated by the fact that a great number of the more weakly specimens die off at this juncture, and those which survive the operation may consider that the worst of their trials are left behind. So radical is the alteration now to be effected that

Master Puss takes four days over the business ; and by the time he sits for his portrait in Fig. 8, he is twenty-four days old, and looks rather like a cross between a gouty chameleon and an elderly earwig. Immensely pleased with himself, however ; and, there being no looking-glasses or young ladies about, he need not bother his head over the countless wrinkles which adorn his velvet jacket.



Fig. 8. Twenty-four days.
Third change.

A good meal soon puts him in a better temper, and he proceeds to “swell visibly” and to fill out more every day, until the beautiful green which is now the principal feature of his attire has a chance to assert itself ; and before he is ready for his last change, he has become quite a handsome insect.



Fig. 9. Thirty-three days.

Gradations of colour are not easily distinguished in a photograph, but it will suffice if I explain that the whole side of his body (see Fig. 9) below the irregular dark line which runs from head to tail, is of a bright apple-green hue.

When our friend is thirty-three days old, he sits

up for his last change. This is also attended with a considerable degree of inconvenience, and it is three



Fig. 10. Thirty-six days.
Fourth change.

days before his skin splits to let him out; but he now has a firm, strong body, and a splendid constitution with which to grapple with the task, so there is a good chance of his eventual triumphant emergence from his difficulties. Thus he appears in Fig. 10, where I have taken him immediately

after the termination of his labours, as he stands to recover his breath after his exertions; his old skin may be seen lying behind him, like a cast-off glove, perfect and complete in every detail, even to the two curious little tails!

Master Puss now well deserves any admiration that he may receive, for his finery is gorgeous indeed, with the addition of a crimson collar — an exact counterpart of the crimson circles to be seen round the galls on the leaves of any willow-tree—



Fig. 11. Thirty-eight days.

besides a row of bright silver waistcoat-buttons. The rate at which he tackles the leaves is now positively

terrific, as may be judged from the fact that the illustration (Fig. 11) was taken only two days after the preceding portrait!

As an instance of the power of a hungry caterpillar to “put away” provender, I must yield to the temptation to reproduce a photograph of the result of one of these caterpillar orgies, together with the perpetrator thereof. The illustration at the end of this chapter shows a single leaf from an elder bush, as it appeared after twenty-one minutes’ work by the caterpillar whose portrait is seen in the corner.

Now, when we remember that this specimen is not nearly so large as the gentleman whose biography we are considering, and yet can make this huge gap, in so short a time, in a leaf which was perfect when he started, we can imagine to some extent how much of the leaf would remain when Master Puss had satisfied the cravings of the inner caterpillar! The former beast walked up the stalk as soon as I presented it for his inspection, and then started vigorously at the lower end of the leaf. It is interesting to notice how for the first few minutes the keenness of his hunger led the diner to eat up his bread and butter, crust and all—the crust being represented by the ribs of the leaf—but that, by the time he had reached the third layer of crust, his appetite had sufficiently abated to allow room for those feelings of fastidiousness for which most caterpillars are remarkable; and, in consequence, we may see clearly how he has worked *along* the rib, instead of biting *through* it, until he gets near the end, where it is thinner and softer.

In Fig. 12 we see the gentleman enjoying a snooze after his *List* meal, by which time he has attained the ripe age of seven weeks. He feels now that his cater-

pillar days are numbered, and that the most notable change in his existence is looming on the horizon.



Fig. 12. Forty-nine days.

So he composes himself for a good long nap, which he often prolongs for twenty-four hours. Somnolent and inactive, the beautiful sheen of his green coat, which had been

kept bright by the constant vigour of the active life within, now gets gradually darker and duller, and the whole body shrinks considerably in size, until, after about three days of his self-imposed fast, he appears a mere parody of his former self. Here we see him in Fig. 13 resting awhile, for during the last two days he has been anxiously wandering up and down the trunk of his native tree, in search of a suitable site for the erection of his tomb.

I must here mention parenthetically that, during his whole life-time, the Puss caterpillar is endowed with a most violent temper; and if he is in any way annoyed



Fig. 13.

or interrupted, he will bridle up at once, throw his head in the air in concentrated fury, and shoot up

and down a couple of red danger-signals from the two tails at his latter end. I have taken him in this characteristic attitude of outraged dignity in Fig. 14, though unfortunately the red flags have not come out in the photograph, as he stupidly popped them in during the fraction of a second when the shutter was open.



Fig. 14.

Before going on to describe the construction of the cocoon, I must show the gentleman again in Fig. 15, as he appeared when I took him out of his stronghold some days afterwards, and just before he is ready to change into the chrysalis figured in the next illustration.



Figs. 15, 16.

This is the last time that we shall gaze upon Master Puss as a caterpillar, and we may see that he has shrunk to less than half the size that he was when full-grown in Fig. 12, his legs having almost dwindled away to nothing, and his once erect tails being tucked in underneath in most disconsolate fashion. We all know that something is



"Elder"-leaf, showing the amount eaten by the caterpillar in twenty-one minutes.



wrong when we see a dog with his tail between his legs, but the woe-begone expression of his countenance is nothing to that of the caterpillar under similar circumstances! And well may he feel wretched, for he would tell you, if he could, that strangely uncomfortable sensations are going on in the region of his inside, and that the whole of his internal arrangements are undergoing a sort of general turn-out and “spring-cleaning” preparatory to assuming the totally different form required by the sober-minded chrysalis.

When this final moment arrives, the caterpillar—or what remains of him—shuffles out of his last coat in the same way as he did before, excepting for the fact that, having no legs, he is compelled to *roll* out. Afterwards we see nothing but a long green, flabby, unsightly object, which gradually shortens a bit, grows hard and black, and eventually appears as it is seen in Fig. 16.

Here we must leave him for the present. In the next chapter we will turn our attention to the building operations of the Puss caterpillar.

CHAPTER II

THE MASTER-BUILDER

I HAVE introduced my readers to the Puss caterpillar. We have followed his career through a life of absorbing interest, and we left him choosing a site for the erection of his castle.

Now he requires no outside help for this all-important task, nor does he find it necessary to call in a numerous staff of workmen to aid—or hinder—him in the construction of his winter quarters. Even the services of an architect can be dispensed with, for Master Puss is his own architect; in fact, a veritable jack-of-all-trades, for he combines with his architectural qualifications those of carpenter, mason, bricklayer, and navvy. An accomplished person, forsooth!

And it is just as well for trade, I ween, that we enlightened mortals are not so clever as the humble caterpillar. I have lately been adding a new wing to my house: fancy if I had been able to take off my coat and do the whole job single-handed! In such a case the builder would certainly have been deprived of the eminent satisfaction of presenting a colossal bill, and of receiving a colossal cheque for doing everything wrong; but it would fall rather hard on the workmen. Although, if one intended to follow

in the footsteps of the caterpillar with strict accuracy, it would be necessary to complete the work *first* and take off one's coat *afterwards*! That is how the caterpillar does it; but perhaps he has been studying the precepts of the Duchess in "Alice Through the Looking-glass." Let us watch him.

We will suppose that he has at length settled upon the site for his castle, after much vain wandering and indecision of mind, and perhaps has even made one or two abortive attempts, to be abandoned after a few minutes. I can never make out why the caterpillar makes these sham beginnings: whether he does it merely for the sake of practice, or whether he really intends it to be the foundation of his cocoon, and leaves off eventually because he is disturbed, or for any other reason; but at any rate the fact remains that most of them are in the habit of making one or two fruitless starts before they settle down to the business in real earnest.

In Fig. 13 of the chapter on his life as a caterpillar, we left Master Puss in an attitude of serious contemplation, and I will ask my readers to look back at this illustration for a moment, as it was taken a few minutes before the builder started work. In his natural state he will choose a spot on the trunk of his native tree, preferably in some crevice of the bark; but in captivity he will make use of any material given him, although a piece of wood will undoubtedly rejoice his heart most.

Nor must we suppose that the cocoon of the Puss caterpillar is any such milk-and-water affair as those produced by the majority of cocoon-making caterpillars, which are composed of soft, and often beautiful, silk of various colours and textures. No, indeed!

No such stuff for him! Strong glue will answer his purpose better, and with that intent he is provided with a little cupboard inside him well filled with a mixture of this sort.

Now, being a person of no mean intelligence, he is aware of the fact that glue alone is not so strong as it might be, but that, with the additional help of other materials, a far more serviceable construction may be produced; for, mind you, he intends his fortress to be as impregnable as Port Arthur. And no doubt the deliberation which had occupied his mind for some twenty-four hours after his last meal was on the subject of material, and his subsequent wanderings during two entire days were certainly undertaken with the set purpose of inspecting samples. No second-rate material will do for this careful builder, and the bricks and mortar which are to compose his castle must be the very best on the market. At any rate he eventually comes to the conclusion that he cannot well improve upon wood—the same strong material of which our cricket bats are fashioned.

Look! He is moving. He walks slowly forward, running his mouth over the surface of the piece of wood which I have given him, just as though he were licking it—only that he has no tongue—until he reaches the edge; then he opens his powerful jaws, and brings them to again with a crash. Once more, and he is satisfied that there is nothing wrong with the works, and the third time the jaws meet in the solid wood. What! He cannot be going to eat the *wood*? No, his digestive organs are not now in a condition to undertake the assimilation of even such digestible compounds as Benger's Food, much less a strong deal board or willow (if he is on his favourite

tree-trunk). Notwithstanding, mouthful after mouthful disappear in rapid succession, until we begin to fancy that the creature must indeed have taken leave of his senses.

However, we are not kept waiting long for the solution of the mystery. The caterpillar takes a step forward, waves his head in the air, after the manner of a showman endeavouring to engage his hearers' attention,

makes a few magic passes, like a lady gymnast at the Hippodrome when she thinks she has done some specially clever trick, and then he solemnly brings up



Fig. 1.

a mouthful of strong home-made cement, composed of fragments of wood mixed together with the glue. He deposits the compound upon the edge of the board, and it immediately sticks to the surface, and he proceeds to add another, and yet another mouthful of



Fig. 2.

similar stuff, until a strong wall is seen to be growing up before him.

Fig. 1 shows him hard at work upon the barrier which he has just begun, and Figs. 2 and 3 give the further progress of the work, although in the latter the caterpillar is depicted turning his back upon the foundation, as if in disgust. There is a reason for this action, for it is at this point that Master Puss often seems to lose heart, unless it be, as I suggested above, that he makes these attempts solely for the sake of practice, considering himself perfect in the



Fig. 3.

art by the time he reaches this stage ; anyhow, in this particular instance he gave up the work when it had attained the dimensions shown in Fig. 3.

In this illustration we can see particularly well the effect of the caterpillar's numerous bites upon the wood, the edge to the left being gnawed and nibbled as if a brace of mice had been at it.

The builder walks away, meditates for a few moments, and then begins again in another place, where he appears in Fig. 4, having annexed a twig of willow, by way of supporting the outer wall of

the cocoon. This I at once removed, as it to some extent impedes our observations. The caterpillar, nothing daunted, works away with a will, and we can see by the set determination of his expression that he now means business, and wild horses would not have any effect on him.

Ere the shutter of my camera snaps upon the plate reproduced in Fig. 5, the diligent worker has turned about, and is rapidly enclosing himself all round, the upper part of him being already surrounded.



Fig. 5.



Fig. 4.

He does not now use so much wood in the construction as he did in his practice attempts, but apparently seems intent upon getting himself well covered in first with a wall, no matter how weak as long as it hides him from the public gaze, reserving the business of strengthening the

material for a future occasion. The lightning-like rapidity with which his head is now darting backwards

and forwards is most fascinating to watch, as the threads of glue fly to and fro, and the perfect method and systematic manner in which the distant points are connected, and then the intervening spaces filled in, make it impossible to believe that the builder has not been engaged exclusively upon such operations for years.

Fig. 6 shows the caterpillar completely covered in,



Fig. 6.

with the exception of one end, which he is busy filling up as fast as he can; and this illustration possesses peculiar interest from the fact that the builder has had the cheek to commandeer my thumb as a point of vantage upon which to fasten the threads on one side of the cocoon! This curious result has come out very clearly, and the actual junction of the threads with my flesh can be readily distinguished. I was holding the bit of wood upon which he was building in order the better to be able to observe the operation; and, as I was studying some notes at the time, I did

not see what he was up to until I discovered that my thumb had been thoroughly pressed into the service — in fact, could scarcely be called my own ! However, I allowed him the use of it until he had entirely hidden himself from view, when suddenly a sharp bite warned me that he was about to begin the strengthening operation ; and I hurriedly withdrew my thumb, not seeing the force of having a hole bored in that member for the edification of the caterpillar. This action necessarily made a large rent in the structure, but in less than nineteen seconds the breach was made good by the active carpenter !

Fig. 7 shows him at this point, and we can just distinguish the form of the caterpillar curled round



Fig. 7.

inside the cocoon, by following the white lines on his back.

The strengthening process is now in full swing, and we can hear the powerful tools of the worker grinding away as he digs out great mouthfuls of the solid wood from the floor of his castle, and adds layer upon layer to the massive walls. Harder and harder grows the structure, as the clever little mason piles up brick after brick, until at length the cocoon appears as we see it in Fig. 8. I have drawn a band of ink round the fortress, in order that its dimensions may be quite clear.

Perhaps my reader will oblige me by placing this page flat upon a table or other hard surface, and then pressing with his finger and thumb as hard as he likes upon the figure of the cocoon; let him then try the more decisive pressure of his clenched fist. The result will of course be the same in either case, and he will not be able to make the slightest impression upon it. Reader, if it were the *actual* cocoon upon the table



Fig. 8.

before you, instead of its mere likeness, your energy would be equally wasted: such is the prodigious strength of the work turned out by this caterpillar builder! No jerry-built house for him! He must have everything of the best. Moreover, before he is satisfied with the

condition of the walls, he submits every part of them to a searching examination, pushing against the sides with all his might, in order to give the work a thorough test.

With the object of ascertaining how long the caterpillar would retain his spinning powers, I made a hole with a knife in the wall of his cocoon every day after he had finished the actual structure, and upon *twelve* successive days did he promptly repair the breach. On the thirteenth his powers were evidently failing, for his attempt proved abortive, and only a thin film of worn-out glue could he muster with which to fill the opening.

We may judge of the immense amount of material used by this builder by the illustration, Fig. 9, which shows the floor of another cocoon. The great hollow made in the solid wood by the jaws of the caterpillar appears as if it had been cut out by a sharp chisel; and this illustration, better than anything else, helps us to understand the efficacy of Master Puss's implements.



Fig. 9.

Fig. 10 shows the roof of this cocoon from the inside, and gives us some idea of the thickness of the walls. As a test of the strength of the fortress,



Fig. 10.

I may mention that the cocoon in Fig. 8 showed no signs of collapse under the pressure of weights to the extent of over 50 lbs.!

There is a very amusing experiment which can be made with the caterpillars of the Puss moth. If kept in captivity, where they cannot obtain access to the bark of any

tree to assist in the construction of their cocoons, they are usually glad to avail themselves of any

substitute that they can get hold of for the purpose ; and, when they are placed in a wooden box, they will calmly—and without dreaming of asking permission—make use of the sides of the box, gnawing out the wood from them to mix with their natural glue. Moreover, if the sides of the box are not pretty thick, they will bite through as likely as not, and one will find an empty box in the morning !

Having noticed that these caterpillars would generally use whatever was provided for them, I placed one in a box which I had previously covered with several layers of pink paper ; and, as the caterpillar had to gnaw through the paper before it could get at the wood underneath, the result of its labours was, as I surmised, a beautifully artistic cocoon of a delicate pink shade.

Similarly, another caterpillar was persuaded to construct a blue cocoon, and another produced a black-and-white one. On another occasion I placed one in a tin without any material at all to see whether it would adapt itself to the circumstances. The creature wandered about the tin for some time in a most disconsolate frame of mind, vainly searching for some sort of material, but at last was fain to give up the attempt in despair, and finally made a cocoon in one corner, of its own unaided glue. The cocoon was not, of course, nearly so hard as it would have been if the caterpillar had had a proper supply of wood with which to strengthen it ; but, all the same, it was astonishingly tough, and gave me a good idea of the remarkably firm consistency of this natural glue.

Another caterpillar was kept in a wide-mouthed jam-bottle, with some coarse muslin over the top, fastened by an elastic band round the neck of the

bottle. It was inconvenient to put it in any other receptacle, as I was travelling in Scotland at the time ; and, as I did not think the caterpillar would be ready to commence operations for some while, I thought it would not attempt to escape from its comparatively insecure abode.

However, the caterpillar thought otherwise. Scotch air seemed to suit it, and it had finished feeding before I was aware of the fact. Therefore, finding no wood in the bottle, it promptly bit through the muslin on the top, and went forth to forage on its own account. The result was that the next morning I could only discover the *hole* through which the truant had made its escape, and not a trace of the caterpillar could be seen !

We had come to anchor by that time in a charming cottage on the banks of the Spey, and I had left the bottle overnight upon the dressing-table ; but though I subjected the whole room to a diligent search, the miscreant would not come to light. After a while I gave it up for lost ; and several days afterwards, when I began to take the muslin off the bottle for the accommodation of some other caterpillars which I had found among the heather, I noticed, to my surprise, that I could not undo the elastic ; and a closer examination revealed the lost caterpillar snugly ensconced in the groove formed by the neck of the bottle, and busily engaged in putting the finishing touches to a cocoon which it had fashioned out of muslin and elastic, in default of any more serviceable material !

Presumably the caterpillar, after escaping through the hole which it had bitten in the muslin, found that it could not climb down the slippery side of the bottle,

-

but could only walk round and round the overhanging edge of the muslin covering, to which it could cling comfortably, but which did not reach near enough to the ground to enable it to get off—and it would scarcely have been safe for a gentleman of his proportions to risk a jump! After a time, doubtless tiring of this unprofitable pursuit, it wisely decided to make the best of a bad job, and to be content with what material there was to hand. Anyhow, the result pleased *me* mightily, though the proceedings may not have been quite in accordance with the caterpillar's sense of the fitness of things; and I have still got the elastic-muslin cocoon among my curiosities.

As we have followed Master Puss thus far, it seems a shame to leave him at this stage, self-buried in the depths of his wooden fortress, and to make no mention of the glorious life before him in the future, when the returning warmth of the powerful Spring sun gladdens his heart, and effectually wrests him from the clutches of the long trance under whose spell he had lain throughout the winter months.

But now the question arises, how is he to get out again from the cell in which he has hermetically sealed himself, and where he has lain as securely imprisoned as any convict in Dartmoor gaol? It was easy enough for the caterpillar to manipulate his glue when it was liquid and ready for use, but it is quite another matter to melt it down after several months of exposure have hardened it to the semblance of sheet-iron.

I have often been asked how it is possible for the Puss moth, when it is ready to emerge, to succeed in making its way out of so solid a structure as we have

seen the cocoon to be ; and, indeed, it may well be a matter for surprise, considering the frailty of a moth, and the impenetrable nature of the wall surrounding it. "Does it *bite* its way out?" a lady once asked me. Assuredly not, my dear madam, for the very good reason that it has nothing to bite with ! But what about the mighty jaws with which it could once have cut its name in any tree-trunk with consummate ease ? Ah, if the moth still retained the powerful implements which it possessed as a caterpillar, it would indeed be a matter of small moment to bite its way through even that strong material ! But its nature has undergone a total change ; the jaws which proved of such service to the caterpillar would be of no use to the perfect insect, and they have therefore entirely disappeared, and their place been taken by a delicate proboscis, which is of no avail for any purpose saving the one use for which it was made—that of sipping honey from the flowers.

How then is the imprisoned creature to effect an egress from its dark dungeon ? And how is it to discover the "Open, sesame !" to unlock the gates which enclose it as securely as if they were of wrought steel ?

Nature, as usual, is equal to the occasion, and supplies the moth with an efficient latch-key, in the form of a little store of special fluid containing powerful dissolving properties. Consequently, as soon as the moth has broken its chrysalis shell, and is ready to come out into the world, it squirts out a drop of this fluid, therewith melting a hole in the end of its cocoon, and then marches forth as easily as if the barrier were composed of nothing more impenetrable than tissue paper ! Neither is it necessary to make a

very large hole, for it is astonishing what a small aperture the body of this huge moth is capable of squeezing through!

It is most instructive to watch one of these fluffy beauties forcing its way out; and the amount of wriggling and fuss that goes on during the process might lead one to imagine that the occupant was suffering acute agony—perhaps paying a rather late penalty at the hands of the indigestion fiend for the rapacity of his caterpillar days! His manoeuvres during the operation are greatly assisted by the strong spike with which the tail of the chrysalis is adorned, which, in fact, he can use as a kind of “climbing-iron” to stick into the side of the cocoon, and thus work himself about from side to side.

Last Spring I was very anxious to obtain a series of photographs of the Puss moth while making its *début*, and with that intent I ensconced myself in my studio one morning, shortly after I had heard signs of unusual restiveness proceeding from the interior of one of my cocoons. I arranged my camera and the cocoon in position, so as to be ready for the first appearance of the prisoner, and took up my stand with a note-book.

I had not long to wait before a movement at the end of the cocoon showed me that the “melting” process had already been accomplished, and that the moth was even then preparing to make the hole for its exit. The wriggles from within grew fast and furious, and I knew that it could not be long before I should see the coal-black eyes of the pent-up prisoner.

Then an unfortunate thing happened.

As the result of an unusually vigorous effort on the

part of the gymnast within, the cocoon tilted over and fell to the floor. This, in itself, was of no account, and I speedily had it replaced, waiting for the next *dénouement*. But apparently the shock of the concussion had upset the mind of the Puss to such an extent that she thought—for the moth proved to be of the female persuasion—that she must have at least been in a motor accident, and she accordingly decided to “bide a wee.” And this she did, with a vengeance, for wait as I would, there was no repetition of the internal struggles which had portended the release of the insect.

Time was passing, and I began to wonder whatever could have happened to the timorous beastie. The clock struck again, and yet again, and I saw that it was getting near lunch-time. Never mind, I was going to secure my series of photographs, however long I had to wait for it! I did not like to assist the lady, or do anything to rouse her, in case such well-meant help might result in the subsequent crippling of her wings. At last I even began to fear that she might take so long to recuperate after her fright, that there would be no light left for me by which to photograph her, when at length she should condescend to emerge upon the scene (for I generally like to take my subjects before two o’clock if possible, in order to get the best results). In taking the portraits of such specimens as the one shown in the accompanying illustrations, I use a magnifier of high power, and this consequently entails a longer exposure than would otherwise be given; and, as the light decreases, the exposure has to be correspondingly increased, and this—in the case of a lively insect—considerably minimises the chances of a satisfactory result.

At last, welcome sight, a sudden jerk came from the cocoon, and almost at the same moment I heard the lunchcon-gong sounding in the distance, and I remembered with despair that friends had been asked to assist at that function ! But it would have taken something more than the fleshpots of Egypt to make me risk losing the chance for which I had waited all the morning ; and accordingly I rushed up to the house,—my studio being situated nearly at the bottom of the garden,—and after a determined raid upon the dining-room, much to the astonishment of the assembled company, I found myself once more upon the scene of action, after an absence of not more than two minutes, reinforced with a couple of plates of hastily loaded victuals and a jug of cider, while the necessary glass, forks and other implements of consumption protruded from my side pocket. Moreover, I was only just in time, for the sitter claimed my instant attention, and kept me busy for the next half-hour ; periods of hasty mouthfuls alternating with rapid changing of plates,—photographic ones this time,—and by two o'clock I had obtained the set of illustrations that I wanted, and one or two over in case of failure.

The first I saw of the *débutante* was, as I expected, her rich black eyes, which appeared for an instant through the hole she had forced in the end of the cocoon, and then bobbed back again. Then she waited for a long time to collect her thoughts, unless it was that, being a lady of foresight, she preferred to open her front door some time before there would be any chance of her actually wanting to come out of it, in order to make sure that it was ready in good time,—like the two old ladies whom I saw at

Charing Cross station the other day, country cousins obviously, who had arrived there shortly before eleven o'clock in the morning, with the object of hurrying across to Euston to catch the 2.20 express to the North ; and it was quite pathetic to hear them asking a porter whether they would be in time for it ! Anyhow, my lady waited so long that my anxiety about the light began to return ; when at last the eye, which I kept constantly fixed upon her cradle, caught a glimpse of a fluffy leg thrust through the aperture. Fig. 11 shows her in this position ; and in Fig. 12 she has further advanced, and part of her head and one eye are also visible.

The illustration in Fig. 13 shows another leg out, and the head much further up ; and the acquisition of this photograph was remarkable for the fact that, in changing the plate, I upset half a glass of cider into the gooseberry tart. That, however, is neither here nor there, and Fig. 14 shows the moth with her head and shoulders out, resting for a moment preparatory to the final effort which will land her bodily outside. Moreover, it will not be long before this takes place, as I can already see a suspicion of fluffy wings making their appearance.

Another moment, and she is dragging her huge unwieldy body out through the opening in the cocoon, whence she crawls rapidly up the surface of the background against which I had pinned the cocoon. There we see her in Fig. 15 just settling down for further reflection.

"But where are her wings?" I hear some one exclaim. Exactly ; where are they ? Is she crippled after all ? "And in spite of your heroic efforts to eat compôte of gooseberry and cider?" murmurs a



Fig. 13.



Fig. 16.



Fig. 12.



Fig. 15.



Fig. 11.



Fig. 14.

sympathetic friend, who has ventured down to my studio after lunch, prepared to condole with me over the cripple, as her eye lights upon the pitiable object shown in Fig. 15. "Wait a bit," I reply, with a smile, for I know the apparent cripple is as sound as a bell; and I persuade her—*i.e.* the moth—to crawl on to a piece of stick held out in front of her, in order that I may have the opportunity of immortalising her profile.

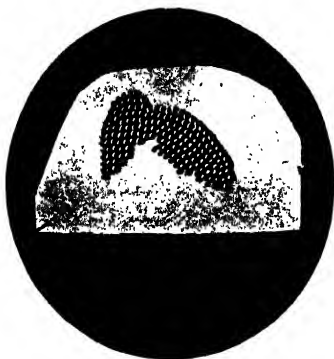
Fig. 16 shows her side view; and we can clearly see, hanging down by her side, the only pretence of wings of which my Lady Puss moth can boast at present. What, then, is the solution of the mystery? By what magic power can the helpless cripple, which we see in Fig. 16, be transformed into the perfect moth shown in Fig. 17?



Fig. 17.

The explanation will be found in the next chapter, where I shall introduce to my readers what must rank as one of the most wonderful phenomena in the whole of Nature's nursery; and to show by means of a series of photographs, taken at intervals of a few seconds only, the marvellous process by which the miracle was accomplished.

Here, then, we will leave our friend for a while, enjoying a well earned rest after her strenuous exertions.



Group of eggs.



The same, with the young caterpillars emerging.

CHAPTER III

THE DÉBUT OF MADEMOISELLE BUTTERFLY

MY readers will, I am sure, pardon me for having to some extent broken from the letter of my agreement when I tell them that I have not only kept to the *spirit* of it, but have indeed filled them a cup of stronger measure than could have been the case had I kept rigorously to the promise that I made in the last chapter—which fact should in itself be sufficient justification for the transgression. And this, they will admit, is one of the merest detail ; for whereas I held out as an inducement the prospect of following the steps of the process by which the Puss Moth became transformed from an apparently helpless cripple into a perfect moth in full possession of all its faculties, with the addition of magnificent wings, I have in some degree erred from the direct path of my self-appointed task of providing a solution to the

mysterious condition in which we left that lady in our last interview, by introducing to them a *butterfly* as the subject of these illustrations.

I can also plead extenuating circumstances in mitigation of my offence, inasmuch as the proverbial "forty winks," upon which we left My Lady embarking, were doubled and redoubled, until they ultimately became in number as the sand of the sea, by which time the sun had set, and all hope of obtaining sufficient light for my photographs had perforce to be abandoned. The next morning the moth was of course no longer in *statu quo*; in fact it was inexplicable why the duration of her nap should have been prolonged for more than a matter of minutes. But it is in Nature, above all things, that the unexpected always crops up when we are least looking for it, as if with the intentional purpose of upsetting the calculations of us poor inferior humans.

Furthermore, that the measure of the "spirit" that I herewith provide is of superior vintage to that which I had contemplated, I will avow, inasmuch as the nature of the butterfly, upon which my choice eventually rested, lends itself to far better purpose for the attainment of such a series of "living pictures" than could have been the case with the Puss moth if she had been obliging enough to sit to me as required.

I must say that I was at first disappointed at the inconsiderate conduct of this moth, but I have good cause now to be grateful to her, for otherwise I might not have been led to embark upon the series of photographs which rank among the most successful that have fallen to my lot. I had been casting about for a suitable subject on the morning after the adventures related in my last article, when my eye happened to

light upon a row of cabbages—young Brussels Sprouts, to be accurate—which the gardener had not long before planted in a portion of the kitchen garden which lay just below my studio. The first thing that riveted my attention was the scene depicted in Fig. 1—three fat, sturdy caterpillars of the “Large White” butterfly, known to science by the nom-de-plume of *Pieris*



Fig. 1.

brassicae, “tucking away” for all they were worth at one of the young juicy leaves. “The very thing I want!” I ejaculated, and all feelings of remorse, engendered by the ingratitude of the Puss moth, vanished into thin air as I secured the caterpillars, together with some dozen or so of their brethren.

As I have already treated somewhat fully the various incidents connected with the life of the caterpillar, I will pass over the subsequent antics of these

specimens, and hurry on to the point when we shall find them emerging from the chrysalis state. A few words of explanation are necessary, however, inasmuch as there is a wide difference between the behaviour of the caterpillar of a *moth*, as distinguished from that of a *butterfly*, when about to assume the chrysalis condition. For whereas the caterpillar of the *moth* will hide itself completely from view, either within some form of cocoon, or by burying itself beneath the soft protection of Mother Earth, the *butterfly* caterpillar never resorts to such expedients, but will usually turn into a chrysalis in a perfectly open and exposed situation.

As soon as the caterpillar of a butterfly feels ready to undergo the expected change, it searches for a suitable position of real or fancied safety, on a wall or under a leaf or stalk, and then proceeds to spin a small carpet of silk,—the only form of spinning that such a caterpillar usually indulges in,—to which it makes itself fast by its “tail,” and there remains without any covering until the butterfly is ready to emerge; some species will, in addition, favour the fashion of a silken waistband, and there fasten a single thread of silk round their waists to support themselves in an upright posture, while others are content to simply hang head downwards—not a very cheerful position to keep up for several months on end. At any rate, with but one exception, this is the utmost pretence at cocoon-making which the caterpillar of a butterfly ever contemplates—the sole exception being that of the “Skipper,” which builds a slight silken roof in addition to its platform.

It seems extraordinary how a chrysalis, in this unprotected state, should be able to pass through the

winter unscathed, as many of them do, and to be for the most part utterly uninfluenced by the vagaries and extremes of temperature in which this facetious climate of ours is so fond of indulging, but so it is ; and I have even found one of these chrysalides with an *icicle* hanging from it, and yet the butterfly came out all right the next spring !

We owe a debt of gratitude to the butterfly caterpillar for this obliging habit of eschewing the more

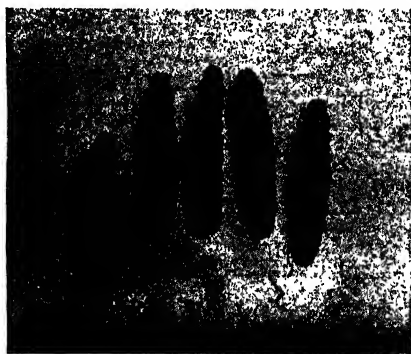


Fig 2.

modest methods of its mothy cousins, for the former affords us a unique opportunity of watching its quaint plans in a manner which would be quite impossible if it were muffled up in a thick winter overcoat ; and, moreover, I should have been denied the chance of taking several of the photographs of this series.

Fig. 2 shows a group of my caterpillars after they had thus "hung" themselves up on the side of the cardboard box in which I had placed them, and waiting for the expected moment when they will feel called upon to shuffle off their mortal coil. We can

see fairly clearly the silken waistband with which the caterpillar on the extreme right is fastened on, and I have put a small cross to mark the spot where the white thread crosses its body.

Fig. 3 shows the same friendly quintet a few days afterwards, when they have successfully accomplished their uncomfortable operation, as they appear in their normal chrysalis state. It is interesting to notice the cast-off coat of one of them hanging just below it,



Fig. 3

which for some reason or other has got caught in the silken carpet, and did not fall off, as is usual after being discarded by the caterpillar.

Now, a caterpillar which hangs head downwards has a much more difficult task than that which falls to the lot of the wearers of waistbands; and it is necessary to watch the process before one can fully realise what an intricate gymnastic feat has to be performed by a member of the former class before it can dispose of its old skin. This can be understood to some extent if we consider the process for a moment.

THE LIFE OF A MOTH

The chrysalis, being a permanent fixture, cannot walk out of its old coat, as is the case with the caterpillar when it undergoes any of its changes of skin, but has to gradually work it off backwards by dint of continuous wriggles, shuffling it off like a stocking, until at length it lies in a wrinkled-up mass upon its tail-end. Now let us look again at Fig. 3, and we shall understand that, just as we can shuffle our stocking down to the foot, but cannot get it completely off *without raising our foot from the ground*, neither can the chrysalis do so, unless it lets go its hold upon the silken carpet for an instant. There is no difficulty in doing so, if the chrysalis is provided with a waistband to keep it in position; but just think of the quandary in which a chrysalis finds itself at this juncture if it is hanging head downwards, and consequently not fastened on by any other means than the claspers at its tail!

Here then is a sort of puzzle, not unlike those queer metal arrangements with which I am constantly being presented by enthusiastic children, and which entail the brain-addling task of getting some idiotic ring off something or other, without touching something else, or something equally distracting! There is sometimes more than one way of doing these puzzles; and if, after much agony of mind, I succeed in getting the ring off, I am generally met with incredulous looks and the comforting assurance that I "can't have done it the right way!"

However, unfortunately for the caterpillar, there is only one solution to his riddle; and this necessitates nothing short of an acrobatic jump, in order to let the skin fall, during which awful moment the chrysalis lies as it were in the air, hanging from nothing. I

once got a brood of some hundred or more of the caterpillars of the Small Tortoiseshell butterfly,—a species which employs this method,—with the sole object of watching how the chrysalis did the trick ; and I saw that it was indeed by means of nothing but a literal jump that the creature could accomplish its purpose. If it missed,—as several did,—owing to a slip, or misjudging its distance, there was no help for it, and it instantly fell from its perch, together with its ill-fated skin ; and there is no saving net spread out to break the fall of these natural gymnasts ! There is indeed a striking resemblance between the performance of the chrysalis and that of a clever acrobat who hangs by his hands from a horizontal bar, and springs thus from it to another bar without changing his position, excepting for the difference that, whereas the human gymnast holds on with his hands, the chrysalis performs the feat with his feet—if I may be allowed to say so. Verily an accomplishment of which the most skilful knight of the rope has never yet been able to boast !

We have now followed our friend safely into the chrysalis state, where we must perforce leave her during the winter snows, and will take up our parable again at the point when the unaccustomed warmth of the advancing spring warns her that she must be up and doing.

Now the frail covering of a *butterfly's* chrysalis shell is practically transparent, and very different from the brown horny case in which the embryo *moth* lies concealed ; and consequently, several days before the insect is ready to come out, the colours of her wings begin to show through the shell and get clearer every day, until on the last day it is

possible to distinguish the very hairs on the body and thorax.

An apt simile is presented by a thing which ladies call an "underskirt," which is very often of some brilliant colour or design, so that the main idea shows very distinctly through the gossamer-like arrangement which they are wont to wear over it. Precisely the same effect may be seen by looking at the chrysalis of a bright-coloured butterfly just before it comes



Fig. 4.

out. Thus in Fig. 4 we can easily distinguish the dark patches on the wings through the thin shell, and especially the rich black tip of the wing (see Fig. 8), which appears in Fig. 4 opposite the white cross I have marked.

Look now at Fig. 5, and we shall see the same chrysalis on the extreme left, with its back view in evidence. The wing-cases are not visible from this point, but we can see how much more advanced this chrysalis is than its three companions by its much darker appearance and general look of dissipation. I must also draw attention to the little tag of silk which is hanging from the tail of the chrysalis in Fig. 4. This



Fig. 5.

is the remains of the carpet which I described before, manufactured by the caterpillar with the object of securing itself to the wall ; and when I pulled the chrysalis off from its position to photograph its profile, a large portion of the silk was dragged off also, thus showing how very firm is the hold of the chrysalis upon it. And very necessary it is that she should be securely anchored to her moorings, otherwise they would never bear the tension of the terrific wriggles by which she signifies her intention of shortly making her appearance in public, and which become more determined as she realises that serious business is impending.

At last the critical moment arrives, and she pulls herself together for a final effort. Wiggle-waggle goes the tail end of the chrysalis, as the fair occupant impatiently strains upwards ; and suddenly her efforts are rewarded, and crack goes her shell round the collar ; another wriggle being followed by a second crack at right angles to the first, down the middle of the shoulders.

The prisoner has now more room for action, and a few more struggles speedily release a long leg or two, and then one of the antennæ, closely followed by its mate ; then a vigorous kick with the remaining legs succeeds in pushing to one side the piece of shell under which they were imprisoned, and the butterfly takes firm hold of the nearest stalk, or any object available for the purpose (see Fig. 7). The battle is now all but over, for a very few more wriggles enable the lady to pull the remainder of her body and wings out of the case, and to crawl bodily on to the stalk, leaving the empty shell behind her, as shown in Fig. 6, practically whole except for the

gaping chasm in the back through which the insect escaped.

It is a remarkable thing that the wings—or rather, the little flaps that do duty, at this stage, for those appendages—are never freed until the last moment, otherwise the chances are that the owner will actually remain for ever the helpless cripple that she appears when we are first introduced to her in Fig. 8; and therefore they are kept covered by their respective sheaths until the butterfly is ready to walk straight out. I have made many experiments in this connection, and I have noticed that if, for any reason, the body should become hitched during the process, so that the wings get free before the body has also broken loose, it nearly always results that the wings remain partially or totally crippled.

This fact I discovered when quite a small boy; and therefore, whenever I helped a butterfly out of the chrysalis—or sometimes even took it bodily out some hours before it was ready, as I occasionally did when I got impatient at the long time it took to make up its mind to begin,—I always carefully kept the actual wings covered until I had freed the rest of the body. If it was as much as twenty-four hours



Fig. 6.



Fig. 7. 11.35 a.m.

before the insect was ready to come out, it was generally crippled in any case as the result of my attentions, but I often succeeded in obtaining a perfect specimen of a butterfly that I had taken out carefully, sometimes as much as over half a day before it would have come out naturally ; though it is of course a risky proceeding to interfere with Nature, and I would scarcely advise any young collector—however impatient he might be—to make the experiment with a very rare specimen !

At 11.40 my lady was free, and proceeded slowly to crawl up the stalk which I had put ready for her accommodation. She may be seen at this stage in Fig. 8, and I will ask my readers to compare the small but perfect atom of wing with the full-blown pinion belonging to the set specimen in Fig. 18, and they will see that it is as complete in every detail, though of course on an infinitely smaller scale. She continues her progress up the stalk, dragging her unwieldy body after her, until she reaches a spot where she can comfortably cling, and fancies herself secure. Then she halts ; and, taking firm hold with four of her legs, she lets go with the other two, folds her silver-speckled antennae down under her wings, and relapses into a sort of trance for four or five minutes, while she recovers from her stupendous exertions.

After this brief rest, she gives a sudden jerk and an uneasy movement of her shoulders, and the fun begins.



Fig. 8. 11.40 a.m.

This "jerking" of the muscles serves to start a kind of automatic pump, to force the fluid with which the body is stored, along the veins and into the wings, and the quondam "rags" begin now to assume the most grotesque shapes. The expansion is very rapid when once it has begun, and it is of entrancing interest to watch the patterns and colours gradually becoming more distinct as the wing gets larger, now a spot swelling out, and now a band widening; for one can literally SEE the wing increasing in size!

I have noticed that very often the wings do not expand at the same rate—that is to say that one side will perhaps "go ahead" much faster than the other, giving the insect a very curious lop-sided appearance until the other side catches up; or one of the underwings will make a sudden "spurt," and overlap the upper wing considerably. I have seen instances when one of the underwings has completely outstripped the other three, and become to all intents and purposes perfectly developed before they had done more than just make a start! I remember being much disconcerted the first time I ever watched the expansion of a butterfly's wings, for the specimen was something of a rarity, and I was much afraid, from the crumpled condition in which the wings remained during the process, that the insect was going to be a cripple. And, judging from the appearance of the insect as it is seen in all but the last four figures of this series, the apprehension was fully justified!

In the accompanying illustrations the veins, through which the fluid is rushing, can be plainly distinguished, as they stand up conspicuous above

the surface of the wing ; and Figs. 9 and 10 show especially clearly the curious warts or mounds which appear on the wings where the "blood" receives a sudden check when it has been pumped in too fast—just as will happen with ourselves if we press a finger tightly upon an artery in the arm or leg, the blood rising up and forming a sort of "knot." But as the wings approach the attainment



Fig. 9. 11.45 a.m.



Fig. 10. 11.46 a.m.

of their normal size, they begin to straighten out and flatten, and the aforesaid warts disappear by degrees as the wings become perfectly straight.

Fig. 12 shows a remarkable cleft in one of the wings, where the fluid seems to have received a check in one of the veins, from which, however, it has quite recovered by the time it has reached the stage shown in the next figure.

The wings have now attained their normal size in Fig. 15, in the marvellously short space of SIX MINUTES from start to finish, and the body has been meanwhile gradually shrinking as the fluid leaves it, until, ere the wings have ceased expanding,



Fig. 11. 11.47 a.m.



Fig. 12. 11.48 a.m.

hurry them on; and although we cannot exactly distinguish an expression of impatience depicted upon the face of the butterfly, any more than, when the process is subsequently complete, we can discern a smile of triumph and self-consciousness, doubtless her own kind could perceive it!



Fig. 14. 11.50 a.m.

it has shrivelled to seraph-like dimensions, with a "waist" of which no lady need be ashamed!

While this expansion of the wings is in progress, it is curious to notice how the insect keeps rousing herself from time to time to give her wings an angry shake, as if to



Fig. 13. 11.49 a.m.

When the butterfly feels that her wings have attained their normal size, she usually shifts her position a little, sometimes only venturing a few steps, or perhaps even crawling along as far as another twig; she still, however, keeps her wings hanging down, for

although quite perfect as we see them in Fig. 16, they are as yet quite limp and flabby, and would be of no use whatever for purposes of flight; in fact, if you turn a butterfly "right way up" at this juncture, the wings simply flop down all round her, helpless and



Fig. 15. 11.51 a.m.



Fig. 16. 11.52 a.m.

an hour and a half later, shows the lady in this condition, her wings still hanging down—for, as I have pointed out before, this is the natural resting posture of the butterfly. But her antennæ are thrown defiantly upwards; for she knows that now, whenever the

hopeless, just as a tent does when the wind blows it down over the heads of its occupants. The butterfly therefore rests quietly for another hour or two, until her wings are properly dry and hard, when she may reasonably expect them to be capable of performing their proper function. Fig. 17, taken



Fig. 17. 1.30 p.m.

fancy takes her, she has the power to stretch her wings and revel in her new-found joy.

The best analogy that occurs to me by which the better to describe this process of expansion, for the benefit of those who cannot watch it for themselves, may be had from one of the toy "squeakers" or air-balloons, which can generally be bought for a penny from one of the hawkers standing in a row in the Strand and attempting to sell fearsome objects of

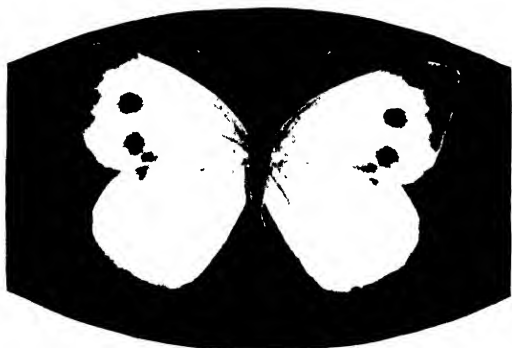


Fig. 18. Set specimen.
Pteris Brussicae, ♀.

various kinds. These articles are usually composed of a narrow, magenta-coloured pipe, at the end of which the balloon is fixed, and through which one blows in order to fill the balloon with air; after which, as the balloon empties itself, it utters an unearthly sort of squeak, as if it were suffering some horrible pain.

Now some of these balloons are adorned with patterns of hideous monsters, which are quite distinguishable when the balloon is empty, although appearing on an infinitely smaller scale than is the

case when blown out—just as the pattern is at first perfect on the butterfly's wing; and if you begin to blow through the pipe very gently, you will get exactly the same effect as that produced in the case of the insect, the pattern gradually expanding and getting larger as the air comes in. Moreover, the similitude is heightened if the balloon be an old or dry one, for then it will expand unevenly, giving an appearance of warts or mounds on its surface.

We must now bid farewell to the fascinating lady, who has so graciously permitted us to lift for a season the veil which hides her from the world and keeps from it the mysteries by means of which she became possessed of those lovely pinions, which look so truly radiant as she flashes triumphantly through the twinkling sunbeams.

I have taken a somewhat similar series of photographs of the proceedings in the case of a moth, which I reproduce here also; for, as will be seen at once, the process possesses a few characteristics which are not shared by the butterfly.

Fig. 1 shows the cocoon, out of which the moth is endeavouring to force her way; Fig. 2 shows the insect immediately afterwards, and it will be noticed how perfectly clear is the pattern of the wing, even at this early stage! Her wings began to expand seven minutes later; and it is worthy of remark that the moth does not throw her wings over her back,—as is the case with the butterfly,—but keeps them at her sides until they have reached the stage shown in Fig. 9, being then almost full-grown.

This characteristic gives us the opportunity of watching the gradual expansion of the pattern on the



Fig. 3. 2:59 p.m.



Fig. 6. 3:2 p.m.



Fig. 2. 2:52 p.m.



Fig. 5. 3:1 p.m.



Fig. 1.



Fig. 4. 3 p.m.



Fig. 9. 3.5 p.m.



Fig. 12. 4.20 p.m.



Fig. 8. 3.4 p.m.



Fig. 11. 3.7 p.m.



Fig. 7. 3.3 p.m.



Fig. 10. 3.6 p.m.

upper sides of the wings in a manner which is not possible with the butterfly.

As soon as the subject of these illustrations evinced an inclination to throw her wings back, I pushed a twig in front of her, on to which she at once crawled, folding her wings flat over her back, so that the upper sides were no longer visible, and the undersides came into view. Let it be remarked that this is positively the only time in the life of a "thick-bodied" moth,



Fig. 13. Set Specimen.
Orgyia pudibunda, ♀.

that she is ever seen with her wings folded back, as in Fig. 11; for, directly they are properly dried, she folds them down by her side, in the normal resting position depicted in Fig. 12—the other posture being essentially that of the butterfly.

Figs. 5 and 6 afford very good instances of the stoppage caused by the too rapid rush of the fluid into the right wing; and in Fig. 7 is seen a capital example of the inequality of expansion in the two sides—the left side having straightened out its "wart" before the right side had done so; and I may further

mention that, at the time I took the photograph shown in Fig. 10, the lower wing on the unseen side had quite outstripped the other, and had even reached the perfect stage shown in Fig. 11, although we can see that the left side is as yet quite immature.

At the head of this chapter may be seen a couple of photographs, representing a batch of upwards of one hundred and sixty eggs, which this same moth subsequently laid on the side of a box ; the second of the illustrations showing the moment when the young caterpillars were in the act of coming out.

PART III

FLORA'S NURSERY

INTRODUCTION

THERE is a delicious restfulness about Nature, which the ever-scurrying "Lords of Creation" might well envy. I love to look at a great oak-tree, and drink in the quiet calm that seems to flow from the spreading branches and permeate everything within reach with the irresistible infection of its own grand peacefulness. It is just this complete absence of turmoil which proves so infectious, and imbues one with such a feeling of rest in the mere beholding of the massive form of this monarch of the forest.

We cannot imagine an oak-tree ever being in a hurry! And yet it is never idle, but always growing, ever soaring upward, inch by inch, adding to the mighty girth of its great gnarled trunk; and it is as difficult to realise that its colossal mass once sprang from a tiny acorn as it is to picture the long-bearded, weather-beaten son of the plough, who rests for a while in the genial shade, as a helpless infant, cooing and prattling—ah! and at times screaming—in his mother's arms! Aye! and still more so to believe that the

majestic pile has stood there motionless for hundreds of years, steadily growing, but never in a hurry, the while many generations of our ancestors have scrambled and tumbled through their three-score years and ten beneath its branches, and returned again to the dust whence they came!

There was a great mathematician who worked out many of his most intricate problems under the shelter of a splendid oak, which grew near his house; and he told me that, as he sat upon a limb of the mossy trunk, soothed by the ceaseless hum of happy insect life, he could feel the gradual stealing over him of an atmosphere of tranquillity, which kept his mind unruffled and his brain up to concert-pitch; and he always found that, here alone with Nature, the course of his reasoning would flow in an easier and more natural channel than could ever have been possible amid the unsympathetic surroundings of his manufactured study! He could get no inspiration from his old oak chair, albeit grotesque were the forms into which it had been carved and worried; and when the jarring discords and petty distractions of every-day life rasped the fine edge of his great mind, so that he felt "at cross-purposes" with himself and the whole world, there was always the haven of refuge to which he could flee, and find solace in its healing balm of peacefulness.

Stand for a moment beneath the genial influence of the spreading branches; and, as we inhale the fragrant breath of the mossy trunk, our very being absorbs the shimmering sunbeams, which filter through the rustling leaves; while from above resounds the sharp tap of the woodpecker, and all around the mysterious stillness is punctuated by the incessant "click, click" of a myriad tiny atoms of insect life! Even the slim

green caterpillars, which hang by frail threads from the lower boughs, swung gently to and fro by every stirring breeze, look happy and unconscious of any necessity for hurry ; while anon, from a bush hard by, trembles the low, contented gurgle of a Warbler, softly crooning to his mate, or the whisper of silvery nothings from a pair of turtle-doves overhead.

Why is it that we cannot help the feeling of intoxicating bliss that overwhelms us at such a moment, and why does the busy toiler feel as though a great load had been lifted from his mind, and as if he had been suddenly imbued with the sense of some unknown power ?

The sensation is akin to that feeling of exhilaration which we experience on a crisp frosty morning, if we go out to take a sharp walk for a few minutes before breakfast. Do we not feel as light as if we were treading on air, and as cheerful as if trouble were unknown ? Is there any reason to account for the refreshing influence of a few moments spent utterly alone with Nature ? Surely it is because our spirits crave for the natural freedom which is man's birth-right, and which, alas ! he has long since lost,—for it is impossible under an artificial condition of civilisation,—and our very blood thrills with the inborn yearning to be natural too !

We are like children in a fairy-tale, looking through a glass darkly, as at a world that is new to them ; who feel, as they gaze at the marvels which are there unfolded, that they have no part or parcel in its beauties ; but they gaze on, ere the vision fade from before their enchanted eyes. So do we, fettered by the trammels of conventionality, feel out of place with the mysteries of Nature, for she will brook none of

such. We are out of our depth, so to speak ; and the sad pity of it is that we never can get into it. All we can do is to look on from the other side of the great gulf fixed between us, and just wonder at the lovely happiness of it all ! It is brought home to us with additional force, as our eyes follow the creeping form of the nuthatch sliding round the trunk, or the squirrel performing a mad helter-skelter among the branches ; and we envy them, as we realise that they have got something that we have not !

And yet we can gather of the crumbs that fall from Nature's table ! We can look on at the great living play from front seats, if only we have the wit to secure them ! And, as we recline among the buttercups, and gaze upward thankfully at the stalwart majesty of the mighty tree, we can even share in the utter peacefulness which exudes therefrom, and drink in with every long-drawn breath the spell of tranquillity which it sheds around !

Assuredly we shall return to the busy routine of our daily toil filled with an infinite refreshment ! And thrice blessed are those to whom circumstances or choice has granted the power to live always in more or less close communion with Nature ; for to such alone is given that deeper insight into the hidden secrets of her mind, and a clearer understanding of the mysteries of that mighty engine whose perfect control drives the forces of natural life.

But that monarch of the forest must have had a beginning, just as much as the rugged labourer beneath it, although the change is so much greater in the case of the former, inasmuch as it has to lose all semblance of its early form and leave for ever behind it the husk that gave it birth ! Nor is the

transformation which produced the stalwart coal-heaver, in the accompanying illustration, from a tiny baby so complete as the transition between the great



The Coalheaver.

oak, under which he is about to pass, and the shiny brown acorn, which will shortly be crunched beneath the wheel of his lumbering waggon.

CHAPTER I

THE BIRTH OF THE BEAN

A SWEET child once said to me, "Uncle, how does that funny little acorn know which way to grow?" She was sitting on my knee under a splendid oak which grew in a favourite corner of her father's grounds, and I had been trying to tell her impossible stories about still more impossible rabbits—*trying*, because it is very difficult to keep up the thread of an imaginary anecdote, when you can clearly see that your hearer is not listening a bit! On this occasion I had quite worked myself up into a pleasant thrill of excitement over the mythical deeds of the hero of my story, stimulated by the enthusiastic interest which my audience at first displayed in his welfare.

But the string of questions had come to an abrupt termination, and I had seen for some moments past, by the unaccustomed lull in the flow of interruption, that the little maiden's attention was attracted by quite something else; and although the adventures of the heroic rabbit were made to become momentarily more alarming, until at length his very fate trembled in the balance (accompanied by occasional despairing nudges from the narrator), the pause succeeding the final words, ". . . and so he died," instead of eliciting

expressions of condolence, satisfaction, or applause, as the case might be, was greeted with the decidedly irrelevant question with which this chapter opens.

I followed the direction indicated by her steady gaze, and beheld an acorn lying on the surface of the ground, partly hidden behind a tuft of grass ; but doubtless its roots were already firmly locked in the moist protection of the moss-covered sward, and the circle of tender young leaves, which already crowned the tiny stalk like some fairy rosette, raised their heads perkily above the soft bed in which they had once nestled.

She was a thoughtful little soul, and it had apparently occurred to her to wonder—inspired, perhaps, by sounds from the region of the distant nursery—why it should be necessary for her younger brothers to be told, “Master Harold, do this!” or, “Master Arthur, you mustn’t touch that!” and yet the trees and flowers, or the little birds in their nests, and the fluffy bunnies in their holes, required no admonition or correction ; and there was certainly no one to tell the acorn that it must do this, and mustn’t touch that, and will be sent to bed if it has to be told again.

Flora’s babies are all models ; they do exactly what they are told—or, rather, they do not need to be told, for they are born with the instinctive knowledge of what they have to do, handed down from countless generations—and, as long as no external agent comes to prevent them, they will do it. So the acorn knows full well that it is as necessary for her little stem to soar upwards, as it is for her long white tap-root to burrow downwards in a precisely opposite direction, and wind its snake-like folds securely in the bosom of Mother Earth.

If we were to come out one fine morning and discover that some tree or plant in the garden had taken it into its head to grow downwards, and to correspondingly spread its roots abroad in the air, our astonishment would be as genuine as it was in the case of a celebrated dignitary at Cambridge not many years ago. He was a great botanist, a Fellow of his college, and, moreover, so unpopular that the men had applied to him—with that charming consideration for the feelings of those in authority so characteristic of the average undergraduate—the sobriquet usually associated with a gentleman who is represented in pictures with horns and a cloven hoof.

The great Don spent his vacations abroad, hunting for treasures of the botanical world. On one occasion he brought back with him a very beautiful and rare shrub, which he had discovered in some remote corner of the globe, and planted it in triumph in a specially prepared bed in the college garden.

Whether the stranger resented its abduction from its native soil, and transportation to a foreign clime, history does not relate; but anyhow, when the great Don went out on the following morning to inspect his prize, the branches thereof were firmly embedded in the earth, while the roots, dry and clean, waved in the air, and a label attached bore the inscription, “*Bulbum Satanicum Bottom-Uppermosticum!*”

Perhaps this was the one “exception” which is illogically supposed to “prove the rule.”

* * * * *

It soon becomes apparent that Flora's nursery is run on very different principles to that of the Puss

moth or the chicken: as must necessarily be the case, owing to the fact that her children are not capable of independent action to the extent that is possible in the case of the baby Puss, who can amble about among the willow branches to his heart's content; and if he tire of one leaf, there is nothing to prevent him trotting off in search of another. Nor does the baby chicken stand in urgent need of a feeding-cup, or ministering hands to hold it for him; from the very first moment that he is able to stand, he is quite prepared to have a high old time with any incautious young worm or foolish spider that may have been rash enough to venture within reach.

Not so, however, with the baby bean, the infant acorn, or the juvenile dandelion. Nevertheless, the respective mothers of such infants are just as anxious for the welfare of their children as any we could find in the animal kingdom, and are equally clever in the precautions which they take to ensure their comfort; and, moreover, being unable themselves to take any active part in the upbringing of their infants, they resort to various devices in order that they should be given a good start in the world when they are old enough to leave the maternal bosom.

Flora is an inveterate gambler. She produces everything on a scale of magnificent waste. Her babies are born by the million; and she trusts to luck that a certain percentage of these countless numbers may fall perhaps in pleasant places, and have a chance of growing up to man's estate. Her methods are fairly safe, it is true; but it is gambling, pure and simple, for all that. She knows that the chances are about a million to one against each baby

and therefore produces a hundred million *more* than she wants, and imagines she is fairly safe in assuming that some ninety or so will survive. But it is sheer speculation.

Nature's open-handed generosity is indeed remarkable, when we consider the countless myriads of seeds that are produced and scattered broadcast over the face of the earth in the wildest extravagance. Jefferies remarks, in his inimitable manner, that trees "throw away handfuls of flowers; and in the meadows the careless spendthrift ways of grass and flowers and all things are not to be expressed. Seeds by the hundred million float with absolute indifference in the air. The oak has a hundred thousand more leaves than necessary, and never hides a single acorn. Nothing utilitarian—everything on a scale of splendid waste. Such noble, broadcast, open-armed waste is delicious to behold. Never was there such a lying proverb as 'Enough is as good as a feast.' Give me the feast; give me squandered millions of seeds, luxurious carpets of petals, green mountains of oak leaves. The greater the waste, the greater the enjoyment—the nearer the approach to real life." And, we must add, the greater the chance that a proportion of the seeds would escape the many creatures that prey upon them. For, indeed, if it were not for such lavish distribution of their offspring, most trees and plants would have but a poor chance of perpetuating their species when so many multitudes of birds, beasts and insects are for ever walking about seeking what they may devour.

Now the instructions given to every mother who brings up her children in Flora's nursery are something after this fashion: "Have as many children as

you can ; keep them snug and warm while you have got them ; get rid of them as soon as you can ; give them a fair start, and then don't bother about them any more"—precepts which are carried out to the letter by the faithful nurses.

I propose now to visit some of these nurseries, to lift for a moment the veil that hides from us the secrets of their management, and to consider the efficiency of the various conveyances hired by the respective mothers to drive their children forth on their great journey through the world. This latter point being of great importance, I shall dwell upon it to some extent ; because, if the babies were to be simply dropped straight to the ground when old enough to shift for themselves, the proportion which were destined to live would all spring up beneath the shadow of their parents, and the necessary result would be that the whole earth would become studded with clumps of massive thick growth, like oases in the desert,—each choking unit struggling for bare life with its brethren,—instead of being artistically spread abroad and distributed over the face of the country.

Some parents we shall find, however, who are content with merely dropping their seeds straight to the ground. The majestic oak-tree is much too old and rheumatic to embark upon a country walk in order that her infants may be comfortably started in a nice open place, and she does not keep a motor-car to send them in. So she just spills them with a flop on the ground. Most of them are promptly devoured by mice. But one of the little brown babies has perhaps been born under a lucky star. A mouse finds him, and thinks she might as well carry him off for the delectation of her own babies at home. On

the way she meets a prowling cat, and, hurriedly dropping the acorn, scuttles off as fast as she can. Whether the cat catches the mouse or no matters not to the acorn; for the mouse would have received such a fright that she probably would, in any case, forget where she had dropped her booty; so, finding himself in a comfortable position, he soon springs up and grows. Or—to consider another equally possible chance—a bird might pick him up, and being similarly scared by an enemy, would drop the acorn where he would perhaps have a chance of starting life on his own account. And when we consider what an infinite number of birds and mice there are about, the possibility is by no means so remote of a few acorns from each tree finding a billet in this manner.

The same applies to a vast number of other seeds. Among them being the beautiful chestnut, who keeps her babies wrapped up in a green prickly cradle for better protection—a cluster of which appear in the accompanying illustration.

There seems to be a protective significance in the fact that the acorn turns brown when it is ripe and ready to be dropped to the ground. Such an infant has many enemies, and were it to remain of the vivid green colour which characterises it while still rocked in its beautiful cradle among the leaves, it would be so conspicuous, and the odds would be so greatly in favour of its enemies, that it would be not much short of a miracle if it survived the many risks which it would have to encounter; but after it has ripened and become pregnant with a life-germ of its own, its little brown form will take a lot of looking for as it lies upon the dark surface of the earth, hidden among the dead leaves and brown broken twigs until the

return of spring shall quicken its dormant spirit and inspire it to grow.

I went out the other day to look for an acorn or two under a big oak in my garden. The mice and squirrels had long since cleared off all they could find, and I had to hunt for a long time ere I at length discovered one, some way from the parent tree, snugly



The cradle of the chestnut.

tucked up in a crevice of rotten leaves and earth. It had evidently been dropped there in some such manner as I suggested above ; and shortly afterwards a few more came to light, one of which had been tempted by the mild weather to start a tiny white point, which would soon force its way downwards.

It must not be supposed that I intend to imply that *no* acorns or seeds would ever come up if they were to remain directly beneath the parent tree. There is an

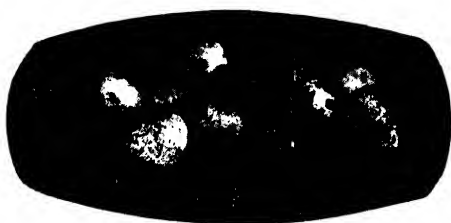
exception to every rule, and particularly so in Nature ; but such seedlings would be weakly, and probably die before they attained to any appreciable height.

Undoubtedly it is during the *seed* stage that members of the vegetable tribes require protection to a far greater extent than subsequently, when they have secured a firm footing in the moist earth and struck their clinging roots deeply into her sympathetic bosom ; for during this period of their existence the luscious kernel with which so many species are provided forms a palatable morsel for birds and mice, as well as larger enemies. Later on the kernel has become absorbed, and the green leaves with which the tender seedling is then crowned, taking their place as mere units among the crowd of vegetation with which the earth is covered, do not run the same risk of destruction ; and, even if they should be occasionally eaten off by a passing sheep, or pieces taken out of them by slugs and caterpillars or cut from them by other insects, there still remain the strong roots, hidden well under the ground, daily gaining strength and vitality to nourish the young plant and supply it with a constant flow of moisture, and thus enable it to thrust forth new leaves in place of those that perish.

Or, again, take the case of a pea. When the pod is ripe, it bursts and scatters its seeds about on the earth ; and we may see how difficult it is to distinguish the half-dozen of these little round objects in the accompanying illustration from the tiny stones which lie strewn around. In fact, the majority of seeds, whose parents drop them to the ground when ripe, are coloured in a similar manner, and undoubtedly in great measure owe their chance of life

to this precaution ; for if Nature had painted them a gaudy blue or brilliant scarlet—as she has purposely done in the case of certain fruits, with the very object of *attracting* the birds, which we shall discuss presently—what hope indeed could there be that their gay coats would escape the notice of the destroyer ?

Let us follow, step by step, the life of a common or garden bean ; and then we will take a few peeps into other corners of my Lady Flora's luxurious nursery.



Six peas amongst pebbles.

The baby bean shares her nursery with three or four others, snugly wrapped in cradles of white velvet with green trimmings ; and the house in which she lives is one of many storeys, arranged after the pattern of London flats, each storey containing two, or perhaps three, nurseries. Fig. 1 shows the sort of story I am telling—two of them in fact ; and I have had to lop off the attics and reduce the nurseries to half-size in the illustration, or I should never have got them in. Now I am sorry to say that the baby bean is not brought up on fresh-air principles, for she is never allowed to have so much as a single window open, and is kept constantly wrapped up in best cotton-wool, so tightly that she cannot move hand or foot !

This being the case, we can conceive how terrible must be the shock to her constitution when the day arrives upon which her nurse opens the door with more violence than consideration, and with a forcible



Fig. 1.

“Out you go,” sends her poor little naked body flying through space, to shift for herself as best she can in the future! But there is method in Nurse’s madness, for she does not cast the youngster adrift until the little body has changed from its original tender green

colour to a dull brown, so that she will be easily hidden, as she lies among the little brown pebbles on the surface of the ground ; and as she is now hard and muscular, she will not at all mind a fall of some forty or fifty times her own height !

Nature abhors laziness. She won't stand it at any price ; so, when her babies are old enough to start life on their own account, no further coddling is permitted, but she turns them out, neck and crop. If they are delicate they die ; if not, well—they take their chance with the others. This reminds one of the practice of the Spartans in days of yore, who used to put their tiny babies on the side of a sloping roof, and let them slide down ; if they had the wit and power to cling to the edge when they got there, they were judged worthy of life ; if not, well—it was a good way from the roof to the ground !

The moisture of the earth soon makes Baby Bean grow fat and comely, and it occurs to her at last that she could get a much better drink if she had some sort of long pipe which she could stick down into the earth and suck up the delicious fluid through it. A hot day comes, and she feels thirsty ; but the sun has dried up all the moisture on the surface, so she decides to wait no longer. "The wish is father to the thought," and, as if at the touch of a fairy god-mother, she can see a little white shoot coming out, just below her one black "eye." She has only one "eye" ; quite enough for her too, for there is plenty of danger always flying around her plump body, without her having two eyes to take it in with, and be terrified into fits !

Fig. 2 shows the baby at this juncture. Her "eye" is not visible from this point of view, the black marks



Fig. 2. February 27th.



Fig. 3. March 5th.



Fig. 4. March 8th.



Fig. 5. March 11th.



Fig. 6. March 14th.



Fig. 7. March 16th

which appear in the photograph to sully the beauty of her white form being wounds. She was very dirty, and had evidently never enjoyed a bath in her life,—like the old man of over eighty, who once informed me, with a gleam of triumph, that he had never had a bath in his life but once, and that was when he fell into a stream; so I scrubbed the delinquent—the bean, not the old man—so hard that I took the skin off in several places.

In Fig. 3 we see her a week afterwards. Her patent hose-pipe is making rapid strides, and has already got its nose dipped well down into the earth. Just as a chicken, when it comes out of the egg, requires no food for some twenty-four hours or more, so has the baby bean a grand supply of nourishment in her little fat body, which will not only last her until she can get her roots thrust far down into the ground, but will even then continue to add stimulus to her powers, until all the good in it is practically absorbed into her system.

Three days later the root has nearly doubled its length, as we can see in Fig. 4; and we may also notice a curious lump appearing on the upper side of the root, at the point where it springs from the "body." This "lump" is surmounted by a kind of cap, which it seems to be trying to push off. It is, in fact, the young leaf-shoot struggling for freedom, and she is still at it when we see her three days later, in Fig. 5. Her long tap-root has here got down so far into the ground that it was impossible to include it in the same picture.

The first glimpse of the actual leaf-element is given to us after another three days, when we see, in Fig. 6, the green bud all but freed from the grasp of the

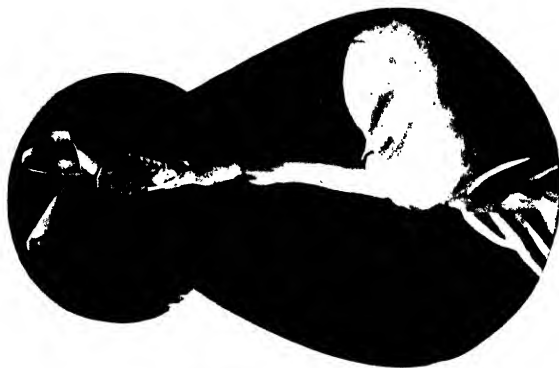


Fig. 10. March 24th.



Fig. 9. March 22nd.



Fig. 8. March 19th.

protecting sheath. In Fig. 7 the baby's head is bowed no longer, but rapidly rising to an erect posture, and three days later the infant displays a singularly robust appearance, partly owing to the fact that her original root has started several tributaries, realising the immediate necessity for an increase in the supply depart-



Fig. 11.

ment, now that the young lady has begun to show green at the top!

Moreover, that these efforts have met with the success they deserve is shown most strikingly in the next illustration, the small roots having well-nigh quadrupled their length in three days. By the time she appears in public again, in Fig. 10, she has acquired such a firm foundation that she even feels

justified in opening her leaves, thus producing a remarkably good imitation of two donkey's ears.

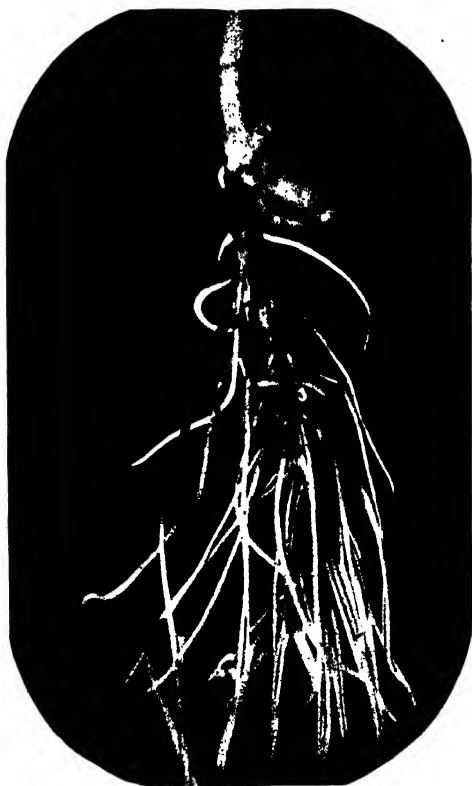


Fig. 12

A thoroughly presentable leaf can the bean boast of when we see her a week later, in Fig. 11 ; and it is no matter for surprise when we turn to the next illustration and behold the eminently satisfactory



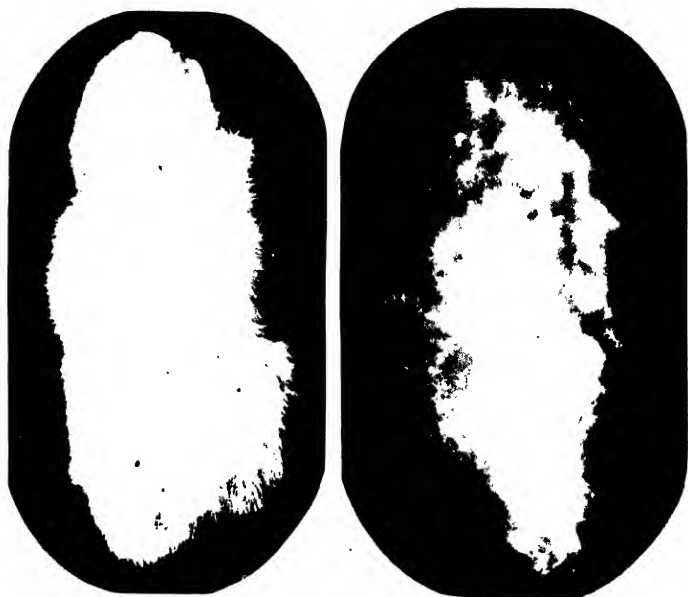
Fig. 13.

commissariat which attends to her wants at this age.

The life of the bean is now plain sailing, and, until we see her again in Fig. 13, her days have been spent in one monotonous round of two-fold growth—the stalwart head ever shooting upwards and unfolding fresh leaves in its path; while the innumerable roots are digging downwards, deeper and deeper, daily tightening the hold of their long clinging arms in the bosom of Mother Earth, the better to form a secure foundation for the straight towering stem, which they are helping to rear above them.

Here, then, we may behold our friend in the full pride of that crowning joy, which is the aim and object of every mother in Nature's nursery—a happy cluster of exquisitely tinted blossoms, whose rich fragrance lies heavy on the evening air.

Our wheel has nearly turned, and one more touch of the magic wand brings us back to where we started, and we find ourselves again with Fig. 1 before us, wherein the Baby Bean has at last attained to the consummation of her desires, and is now rejoicing in a nursery of her own.



A natural puzzle.

CHAPTER II

SHARPSHOOTERS, PARACHUTISTS AND OUTRIDERS

SHARPSHOOTERS

SOME of the nurses under Flora's jurisdiction are quite energetic, and really do all they can to give their babies a start in the world, instead of merely dropping them carelessly to the ground ; and so great, indeed, are the capabilities of certain species in this direction, that one might almost be inclined to credit them with the power of independent motion !

One such mother is the charming violet, whose

purple head nods forth upon the world, from out her bower of broad protecting leaves. This lady is a universal favourite, and rightly so ; and in her radiant smile has many a poet found inspiration. She has, moreover, acquired a character for modesty owing to the fact that the innate instinct—(if we may call it so)—for self-protection prompts this plant to keep so many of her otherwise conspicuous heads concealed amid their girdle of green, in order that a fair proportion of them may have a chance of being spared to produce seeds. It may be heresy to say so, but it really seems more appropriate to describe the “modest little violet” as an “artful schemer!”—although perhaps scarcely more so than many other species of the vegetable kingdom. We shall find, indeed, that there is almost as great a degree of ingenuity displayed by various plants, as ever there is amongst members of the insect world.

(Do not let me be misunderstood. It is, of course, far from being my intention to imply that the flowers—or insects, of which I have spoken in previous chapters—*consciously* resort to the various devices which I hope to enlarge upon during the next few pages, or that it is of any set purpose that the plant provides for the protection of its seeds—a supposition which would necessarily attribute to *vegetables* those powers of reason or intelligence which can only exist among the higher animals. Nature is, of course, the great motive power ; and the flowers are merely some of the instruments she has chosen, to give evidence of her skill—incapable, as they are, of independent action ; yet able to reflect, in their delicate forms, the great power of the magic wand that guides them. But it seems pleasanter, in a work like the present, to

ascribe to the flowers a certain amount of personality, merely for the sake of description ; in the same way as those who write fairy-tales and such mythical stories are wont to endow the rabbits and things with the power of speech, for the edification of the little ones who love such books, and not with any idea of giving the impression that the creatures could actually possess such a power:

I must apologise for this explanation of so obvious a *façon de parler*, but it is natural that I should wish my meaning to be perfectly clear to *every one*, in view of the fact that I was evidently misunderstood by one of the critics of "Nature's Riddles," who seemed to imagine that I gave a certain moth credit for *conscious* imitation of another object, for the sake of protection ; although there was absolutely nothing in my words to warrant such an extraordinary assumption. I was glad, however, to see that none of his confrères discovered any such stumbling-block.)

The violet is a careful nurse, and takes manifold precautions for the welfare of her children. Accordingly, she keeps them well wrapped up in a bed of cottonwool, until she thinks they are old enough to take care of themselves ; and then, when the pod is nearly ripe, she opens it wide on delicate hinges, disclosing several rows of shiny brown babies. These she allows to bask for a while in the warm sunshine, whose soothing rays will soon give them the finishing touch they require. Then, directly the crucial moment arrives, the springs are let go, and, *hi presto!* like so many miniature Jack-in-the-boxes, the seeds are shot out to some distance, in a fairy fountain of rattling spray ! Thus the infants have each a fair chance of making a start on their own account in fresh ground ;



"Dog"-violets. One pod is in the act of shooting out her seeds.

which would not have been possible had they been dropped straight to the earth, for the young seedlings would then have been smothered by the rich growth of the parent plant, or cramped by the long runners which she sends out in every direction.

The accompanying illustration is a peculiarly apt one for the object of pointing out this characteristic of the violet, and I was most lucky in obtaining a result which was not only unintentional, but it would never have occurred to me that it was so much as possible. I had arranged the group of violets, in order to photograph them, to figure in a botanical work upon which I am engaged; and, as the light was not particularly good that morning, it proved necessary to give the subject a long exposure. However, when the plate had been exposed a few seconds, the while I stood motionless, breathless, and watch in hand, I was suddenly startled by a mysterious click from the group of flowers; and I feared that one of the tiny pins, with which the stalks were fastened in position, must have dropped on to the table beneath.

But the thought had scarcely had time to flash through my mind than I heard a faint rattling sound, as of some minute objects being sprinkled on the table; and then I knew that the violet must have chosen that particular moment to launch some of her seeds on their voyage through life, in her own peculiar fashion—and I feared that the movement would have spoiled my photograph. However, I thought I would chance it, and refrained from closing the shutter until the full time had expired; and, when I eventually developed the plate, the same

evening, I was more than gratified with the unexpected result, which is here shown in the illustration. Apparently, the force of the explosion had jerked the whole stalk, which supported that particular pod, into a different position ; and, as it took place when about half the time was up, the result was that the pod



Heartsease, with pod spread open for the seeds to ripen.

obtained an equal exposure in both postures—each being only half as long as it ought to have been, but at the same time, sufficient to make the subject discernible in both instances ! Some of the seeds appear still unmoved in the second position, as only a few of them were shot out in this case.

That delightful little flower, the Heartsease, throws its seeds about in a similar manner, and the photo-

graph here reproduced shows the position of the widely-opened pod more clearly than in the case of the violet, as there was no fracas in the middle to spoil the correct exposure !

I might mention, in passing, that it seems to be in pursuance of the principle of protective colouring that the beautiful *White* Violet is found in much the greatest profusion upon chalky soils, where the snowy blossom, peeping through its canopy of leaves, under the shelter of the hedgerows, would present much the same appearance as the little flocks of chalk scattered about, and would thus the more readily escape notice. I do not mean to imply that this variety *only* grows upon chalk ; for I know of more than one bed of this most delightful of wild flowers, which flourish upon quite other soils ; but, at the same time, I have always noticed that the white variety may be obtained in much greater profusion, and attains a richer luxuriance of growth, in places where the chalk is not far off.

There are other plants which have this interesting habit of scattering their seeds to some distance, notably the Balsam,—the sharp click of whose seed-pods resembles a series of miniature fusillades, on a warm day, when the sun is powerful ; whereas the pretty little Herb Robert, which fills our country lanes with the fragrance of its strong wild scent, can even shoot its seeds to a distance of twenty-five feet !

The accompanying illustration of another of the Cranesbills shows the curious spike-like seed-pod, inside which the seeds are carefully arranged in long separate rows, so that each may have a chance when the spring goes off



Cranesbill," showing the long seed-pod.

PARACHUTISTS

We shall not find, however, that many plants display such energy as that of the violet or the cranesbills ; but, on the contrary, a large number depend entirely upon the help of others, as is the case with members of the Thistle tribe. Such nurses trust to the kind services of the wind to convey their offspring to a suitable resting-place ; and with this object, each seed is provided with an exquisite natural parachute, to keep its small body balanced in the air, and with the aid of which it will float through space, literally "on the wings of the wind !" Many of my readers must have been struck by the sight, during a summer afternoon on the Surrey Downs,—or some other wild stretch of country, when there is a fresh breeze stirring,—of masses of fluffy specks, which fill the air like a small snow-shower ; and they have perhaps felt inclined to wonder how it is that the whole country-side is not eaten up by thistles, since the seeds go flying about in such profusion !

The thistle may be aptly described as the Lion of Flora's Nursery ; for,—in addition to the fact that she impresses the breezes into her service for the distribution of her children,—we shall see later on how she keeps her nursery protected by a complicated system of barbed wire, of a far more cruel character than any human ingenuity could have suggested,—and so excellently constructed, that man, who often takes a leaf out of Nature's book, has seen fit to manufacture the barbed wire, with which he keeps marauders out of his fields and gardens, on almost exactly the same principle.

Another famous parachutist, of complex structure



The Lion of Flora's Nursery.

and great beauty, is the common Dandelion, whose singular seed-head,—as round as a billiard-ball,—is a familiar object in our country lanes and fields. How we loved, as children, to look for these “clocks,” as we called them; and, when we sighted a perfect specimen, what a scamper there was to get it first, in order to blow it, and imagine we could tell the time of day, according to the number of puffs that were necessary before all the seeds were gone!

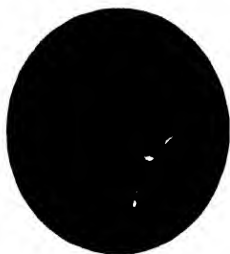
If we examine one of these dainty white balls,—of which I show a specimen in the illustration,—we shall notice that it is composed of numerous seeds; each of which is surmounted by a feathery parachute,—as can be clearly seen in the photograph,—and all fitting closely together, to jointly produce a model of exquisite symmetry. When these seeds are sufficiently ripe, they will relax their hold upon their mother's kindly bosom; and ere long a breath of wind will detach them altogether, and they will be wafted gently through the air, perhaps for some miles, before they are again dropped to the earth, and,—granted a favourable situation,—trust them to make the most of their opportunity! Many a carefully kept tennis lawn will vouch for that!

The wild Clematis, or “Traveller's Joy,” also prepares parachutes for her offspring, and we can see, in the illustration, the artistic feathery plume with which each is crowned.

But perhaps the most wonderful sight is the nursery of a species of Poplar, which hangs like great festoons of cottonwool from the branches. One of these snowy clumps is shown in the right-hand figure of the illustration at the head of this chapter; in which we can see that some of the infants are



Seed-head of the Dandelion.



Single seed, showing its natural Parachute.



Seeds of the "Traveller's Joy," each of which is crowned with a curled feather.

already preparing to take wing. The left-hand figure represents the bird's-eye view of a day-old chicken, looking straight downwards on to its back!—the pair affording an excellent natural puzzle.

OUTRIDERS

Not all flowers, however, provide their babies with parachutes. Some of the youngsters prefer to ride—not exactly on horseback, but what amounts to the same thing. It has been well said that the animal kingdom could not get on without trees and plants, but it is equally true that many plants could not get on without animals to do them an occasional friendly turn. We are all familiar with the little green, sticky balls which are so often found to be hanging on to our clothes when we come in from a ramble through the country lanes and woods; and the more we try to pick them



"Goosegrass," which clings to everything it touches.

off the more there seem to be left. These are the seed-pods of the Goosegrass, and rightly do they deserve the name of "cleavers," with which children have christened them, for so sticky are they that they will cleave to any but the smoothest surface, and even in the illustration the whole plant has a "sticky" appearance!

It was another of our favourite childish amusements when out for a walk to pick a long spray of this trailing plant and place it gently upon the back of our unsuspecting nurse, where it would cling at once without the least pressure, and the worthy soul would gravely continue her walk, in blissful ignorance of the presence of the "foreign bodies" which adorned the back of her jacket; and it was usually not until she reached home, and began to take her things off, that she discovered the cause of the smothered giggles which we had been struggling to conceal from her watchful eye as we walked back through the village.

Now this is the means by which the goosegrass gets her seeds conveyed from one place to another, inasmuch as any hairy or woolly animal that came in contact with them would be sure to carry away a number upon its back and legs, for they will stick to it just as readily as they did to the poor nurse's jacket; and as the beast brushes past other foliage or squeezes through hedges and under bushes some of them will get knocked off, and probably find a resting-place, where they will assuredly spring up, and produce some sixty, some a hundred, but mostly a thousand-fold! They obtain this power of adhering to other substances from the fact that they are covered with minute prickles, each furnished

with a hook at the end, which will instantly lay hold upon anything that comes near.

Again, there is the Burdock, which produces the prickly "burrs" we know so well, each seed of which is furnished with a strong hook, so that directly it is ripe enough it is carried off by the first passer-by that touches it. I have seen a collie dog, which had trespassed into a wood at the time when the "burrs" were ripening, emerge therefrom again with its coat literally matted and woven together with these tenacious passengers.

A different method, again, is adopted by many species of grass, which leave their babies to force their own way into the ground; and consequently one end of



"Burdock." Each seed is furnished with a sharp hook, with which it clings to anything that passes.

the seed is fashioned something like the prow of a boat, sharp and piercing, the other end being furnished with an excellent rudder, in the shape of a long hair-like spike (as shown in the accompanying



Wild Barley-grass. Each seed is furnished with a long rudder, so that it may fall into the ground point first.

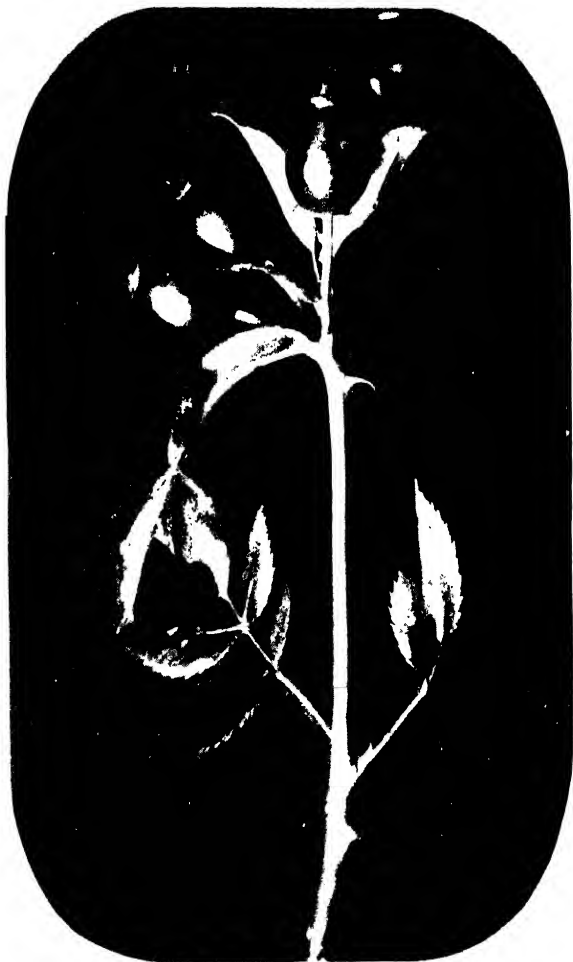
illustration of the wild Barley-grass), which keeps the seed steady, thereby affording the absolute certainty of its entering the ground prow first. That this ingenious artifice is efficacious we have ample proof, after a stroll through the fields in summer-time, by the well-nigh uncanny fashion in which the grass seeds force their way through our clothes, and even find their way to our very skin !

CHAPTER III

“COTTONWOOL”

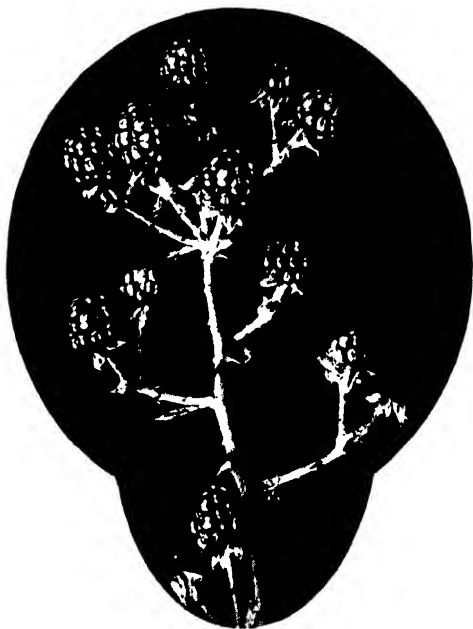
THERE is a class of parents in Flora's nursery which keep their babies wrapped up in cottonwool to such an extent that one might imagine that the constitution of the infant was of the most delicate description ; whereas, in reality, they are robust to a degree, and usually much hardier than any of their relations !

This cottonwool is not of a kind that you and I are accustomed to use, but of a most attractive colour—generally of different shades of crimson or scarlet. Did you ever imagine, dear reader, that the clusters of shiny roseberries, which scramble about like a shower of gems, along the country hedges ; or the exquisite “May” berries, whose radiant flecks besprinkle the tall bushes ; or even the gleams of scarlet, which peep through the foliage of the holly-tree—did you ever imagine that they were produced with the object of gratifying *our* senses, or supplying *our* needs ? Or the luscious blackberries, that we love to put into our mouths instead of into the basket ? Or possibly you supposed that the kind thought of a bountiful Nature provided them, as a welcome banquet for the feathered songsters, which so greedily devour them, and pour forth the rich melody of their joyous thanks for the meal, which they probably think



Roseberries.

is supplied for their sole benefit ! I knew a glorious thrush, which would come to the same spot every morning, and "tuck into" the holly berries, that grew just outside my window, until I verily feared for his digestion ; but the volubility of his wild music after-



Blackberries.

wards—which he kept up for the greater part of an hour—and his fat, comfortable expression showed what *he* thought about it !

Or the plums and cherries in our orchards, which delight the eyes of any small boys who are able to see them in the distance, as much as they do the birds

which revel among the branches, and congregate in a mysterious way from everywhere and nowhere to hold a cherry carnival at our expense—do we imagine that the trees produce their gay clusters as a token of gratitude for the attention that the gardener bestows upon them? No, indeed! there was quite another object in view when those cherries were formed. Doubtless they were intended *indirectly* to gladden our senses, as well as to feed the birds; for Nature delights to make her every action effect a multiplicity



The Spindleberry.

of objects; we might almost say that she loves to “kill two birds with one stone,” if it were not that, in the present connection, some danger of misunderstanding might arise!—but neither of these was by any means the *primary* object.

The berries are intended, in the first place, for the birds to eat, it is true;—in fact, their brilliant colours are specially designed with the sole object of attracting the attention of the feathered world—but not by any means with the view of providing nourishment for them. The glossy blackberry, or the velvet raspberry; the spindleberry in its dress of gorgeous crimson; the

roseberry, arrayed in bright scarlet ; the mountain-ash, whose cardinal clusters greatly enhance the beauty of the Scotch mountain-side ; and countless others,—all are expressly hung out as *signals for the passing birds*.

Now what is the explanation of this apparent enigma ?

Old Mother Holly-tree is anxious to get her daughters “off her hands” ; and with this object she wraps them up in cottonwool, covers them round with a gaudy dressing-gown, and then holds them out as a bait for her friend the thrush. This plump gentleman comes along, and at once spies the pretty Red Riding-hood peeping at him from among the dark leaves ; and the sensations he experiences forthwith are probably very much the same as those of a little boy I saw the other day, standing with his face glued to the window of a sweet-shop.

But the subsequent conduct of the bird is not the same, inasmuch as there is no glass barrier between him and the coveted morsels, nor does he care a jot for any miserable human attempts at notice-boards ! “Finding’s keeping,” and it does not enter his stolid head to consider whether those particular berries were wanted for the Church decorations, or were being jealously guarded from the raids of small boys in order to adorn the Christmas Pudding ; and he accordingly proceeds to help himself with a liberal hand to as many as his fancy dictates ; and finding that they are every bit as good as they look, he pegs away at the delectable banquet until his enormous appetite is satisfied, or until a boisterous rival chivies him away, to the accompaniment of language which would not bear repetition !

Now the bird will probably not be able to digest the hard seeds which lie snugly hidden in the interior of each juicy morsel ; and consequently they will pass completely through him, and so get dropped where they may have a chance of taking root.

Thus has the Holly-tree accomplished her purpose ! And, if she were able, how she would chuckle as she watches the lively thrush flying off, with his crop full of her children ! It is a roundabout process, we must admit, albeit a very ingenious one ; but no doubt Nature knows best.

Darwin was of opinion that it was by this method that most plants with bright-coloured fruits get their seeds disseminated ; and he gives most interesting statistics, in his “Origin of Species,” to prove this point. He tells us that the hard seeds of fruit will pass uninjured even through the digestive organs of a turkey ; and that, in the course of two months, he picked up in his garden no less than twelve kinds of seeds, out of the excrement of small birds, which grew into plants when put to the test ; thus proving that the seed receives no injury.

I have myself found perfect seeds in the pellets thrown up by owls ; which fact shows that the seed must have first of all been swallowed by some small bird, not long before the owl caught it,—for owls are purely carnivorous birds,—and therefore, not having been digested, was still in the crop of the bird when the owl made his fatal pounce. The seed would then travel down into the body of the owl, inside the crop of the small bird,—for it is the habit with many species of owls to swallow their prey whole, and my tame Long-eared owls will even swallow a large field mouse whole, without the smallest compunction,—and the

seed would then be finally brought up again by the owl, in the pellet composed of bits of bone and feather and other fragments which he could not digest. If this pellet should be dropped in a suitable place, the seed inside it would then have a strong chance of growing, inasmuch as the action of the rain and moisture upon the pellet would provide the seed with a first-class hot-bed in which to make a start.

Often, indeed, such seeds have proved to be none



Owl's Pellet, in which the teeth of a rat can be seen.

the worse for their temporary incarceration, and have grown readily. I have got some grains of corn which I extricated from the pellets thrown up by my owls, and they are perfectly healthy; moreover, they are growing away merrily in a saucer, and I hope to be able to include a portrait of one of the young plants resulting therefrom. It is indeed marvellous that the owl should possess this power of internally "sorting" what he has swallowed, and of bringing up again, as a matter of course, the feathers, bones and other débris which he could not digest. The accompanying illus-

tration shows one of these pellets, which is composed of the undigestible portions of a rat's head, and we can quite well distinguish the teeth of the animal. On another occasion I inserted a threepenny bit in the crop of a dead sparrow, before presenting it to one of the owls, and the next day I had the satisfaction of finding it again in a pellet.

Many water-plants drop their seeds straight down into the mud which lies so thickly at the bottom of



Grain of corn, growing after being swallowed by a sparrow and an owl.

every pond, and thus the bed of the pond often gets crammed with seeds of various kinds. Darwin tells us that he made some experiments in this connection, and found no less than 537 seeds in a single cupful of mud. Now, every pond of any size will have its colony of wildfowl of some sort or another, and even a wayside pool would have its occasional visitors,—some stray dabchick or a passing wild duck; and some of this mud from the bottom of the pond is sure to adhere to the feet of the wading birds as they waddle around the muddy edges of the water. If the birds

should be suddenly disturbed when thus employed, they will abruptly rise and fly off somewhere else, and on alighting again would probably rub off the mud from their feet, and thus be the involuntary means of transporting the seeds or plants from their native pond to a place perhaps miles away.

We have discussed at some length the various ways and means of the flowery nurses for launching their children out into the world, and it is frequently owing to one or another of these devices that the botanist's astonished eyes will every now and then light upon some solitary specimen of a rare plant in a most unexpected place, and perhaps even when there are no others within many miles. Thus he may also be occasionally puzzled by the discovery of some flower which he had never known to grow wild in this country at all, and which really had been transported as a seed by a bird from some garden perhaps miles away, and dropped in the middle of the field or wood where the perplexed botanist eventually finds it.

This natural peculiarity might account for the fact that many people seem to prefer to make a collection of *insects* rather than one of wild flowers, which is scarcely a matter for wonder when we consider that so many thousands of species of foreign flowers are cultivated in our gardens throughout the country that we can quite well believe that some of their seeds should be frequently dropped about by birds, and that, granted a suitable spot, they should spring up and become naturalised. Then comes in the difficulty of deciding what is, and what is not, a truly British wild flower.

I know of a sunny slope upon one of the Surrey

Downs where several acres of land lay fallow for a year or two, and the whole of this area was thickly clothed with one great blaze of lavender-coloured poppies, a species which has certainly never been recognised as British, and which must presumably have been conveyed in the first place from some garden or rubbish-heap. Many other plants could be mentioned which are certainly not indigenous to these isles, and which the botany books refer to as “garden escapes,” but which may frequently be found in colonies, or singly in various parts of the country.

Now there is a very much smaller chance of such a possibility with regard to insects, for they are not cultivated in gardens, as is the case with flowers. There are a few professional naturalists in different parts of the country who have regular breeding-grounds where they rear caterpillars in large numbers; and sometimes, sad to relate, certain of this fraternity have been known to be dishonest enough to import foreign specimens of rare British species from the Continent—where they would probably be fairly common—and sell them as British to gullible customers for enormous prices.

A flagrant instance of this nefarious practice came within my own experience some years ago when I had been lucky enough to discover three caterpillars of an exceptionally rare moth upon an oak-tree in a wood in the south of England; the appearance of which, being quite new to me, I took them in to a neighbouring town to have them identified by a naturalist who lived there. This man was a professional “dealer,” in an enormous way of business, with agents in every part of the world; in fact, he had only a few days before shown me some consignments of living

chrysalides which he had just received from Sierra Leone, casually mentioning that he was shortly expecting others from China, Brazil, and other outlandish parts.

He duly enlightened me as to the identity of the caterpillars in question, and I foolishly told him where I had taken them.

I immediately made several subsequent excursions to the same spot, in the fond hope that I might be able to repeat my good fortune; and I subjected the whole wood to a systematic search, "beating" every oak that I could light upon; but no more traces of the coveted treasures could I find. (How curious is the fickleness of Fortune's wheel, which, in any department of life, will so often, by a single turn, reveal to us in a purely accidental manner some piece of knowledge, or a longed-for treasure, which we may have spent years in a vain effort to discover.)

During the ensuing winter I chanced upon an advertisement in an Entomological paper, which caught my eye at once, and caused my blood right furiously to boil. The announcement was inserted by the afore-mentioned dealer, to the effect that he could supply chrysalides "genuine British" of this same moth at £5 apiece; and I subsequently heard that he had over eighty of them, which he professed to have found in the same wood, although the insect is so exceptionally rare that there are not, even now, half-a-dozen other authentic British specimens in existence! Possibly Mr. W. *did* find them there; but, in that case, *he must have put them there first*. Moreover, a few years later, when he had gone over to the great majority, I heard that he was notorious for doing this sort of thing.

Such fraudulent dealings are, of course, to be met with in every walk of life; but let us hope that it is the exception, for I should be the last to wish to cast aspersions upon the integrity of such "dealers" in general, and I quite hope I may say that the majority of them, while breeding or importing foreign caterpillars, would scorn to conceal the fact from their customers.

I have made mention of this incident in order to show one of the ways in which foreign insects might occasionally turn up where they had no claim to appear; and it is quite within the range of possibility that they might at times escape from the breeding-grounds in which they were being reared. Occasionally, also, foreign insects are undoubtedly imported into this country unintentionally in shipments of timber, orchids, or bulbs. But even if any such caterpillar should succeed in reaching maturity after it had made its escape, there is still the strong chance that some bird or other foe would snap it up before any butterfly collector falls in with it and raves over the unwonted appearance of a species new to this country, as well as to his collection.

We see, therefore, that the possibility of foreign butterflies being found at large in this country from any such cause is infinitely small, compared with the similar chance in the case of flowers, so that the difficulty which assails the botanist is not shared by the collector of butterflies, or, at any rate, in such a small degree as scarcely to be worthy of serious consideration.

During a stroll on the Downs at Winchester, a few years ago, I discovered a beautiful specimen of the very rare Long-tailed Blue butterfly, which was

calmly sitting upon the dusty window of an old empty cottage ; moreover, it had evidently only recently emerged from its chrysalis, inasmuch as its wings were scarcely yet dry, thus proving beyond a doubt that it had never used them. And if they had never been used, the proof was equally strong that the butterfly was a genuine British article, and must have been bred and born within a few yards of the spot where I had found it. Therefore,—although less than a dozen miles divided me from the sea, and then it was no great distance from the Channel Isles, where this insect is not uncommon at times,—I was perfectly justified in feeling as absolutely certain that the butterfly which I was tucking away carefully in a pill-box was not “made in Germany,” as though it had been stamped with the hall-mark of its pedigree. But if it had been a flower, I might have hoped and wished ; but all the hopes and wishes in the world could not have proved that some bird had not conveyed the seed from a distance, and dropped it among the clover and wild thyme which were clambering in wildest profusion over the bank which skirted the cottage !



"Blackberry" Flower, or Bramble.

CHAPTER IV

FERTILISATION OF FLOWERS

NOW it is not only in the matter of the transportation of their seeds that the parents in Flora's nursery deserve our admiration, for there is an earlier stage in which their ingenuity is called into play in a still more remarkable manner.

We must remember that the problem of fertilisation enters just as necessarily into the life of the vegetable kingdom as it does into the animal world, and is an equally important factor in the propagation of their species. The delicate blossom at the head of this chapter would never produce a blackberry unless it were properly fertilised, any more than it could if you were to pluck it off and cast it in the ditch; nor would

the bunch of graceful hops which we see at the end of this chapter have ever come into being unless the insignificant green flowers from which they sprung had undergone a similar process. To ensure the accomplishment of this object, plants have to resort to many curious expedients, and the fact that they are incapable of independent movement or action gives special occasion for Nature to supply the deficiency by means of countless forms of wonderful mechanism, such as we do not find in the animal world.

It is very remarkable that there should be this necessity among flowers, and it is hard to understand why Nature should have been pleased to ordain it so, unless it be that she intentionally invented the difficulty in order that she might be afforded fresh scope for her marvellous creative faculty. Indeed, it often seems as if such natural obstacles are produced with the sole purpose of giving an opportunity for surmounting them by means of some extraordinary design, for the difficulties themselves are of so complicated a nature that they can admit of no other than an equally complicated solution.

I let me make my meaning clear by means of the accompanying illustration of a tulip and daffodil flower, the sides of which I have cut away in order that my camera might have a better opportunity of depicting their internal arrangements. I do not intend to introduce the scientific names for these parts, or to speak of "anthers," "carpels," etc., any more than is absolutely necessary, as I wish, as far as possible, to avoid technicalities in this work; nor shall I embark upon a lengthy explanation of the different

factors in the mechanism of a blossom, but I must briefly mention the one or two facts that are essential for the proper understanding of the subject of the fertilisation of flowers.

As will be seen from the photograph, the interior of the flower contains a long poker-like arrangement in



Tulip and Daffodil interiors, showing "stamens" and "stigmas."

the middle, and several wand-like spikes grouped around it, each of which latter is surmounted by a knob, resembling somewhat that upon the "antenna" of a butterfly; and these, in their turn, supply the grains of golden dust or "pollen." The whole of this wand, which in these particular flowers is in shape very much like a bulrush on a small scale, is called the

"stamen," and the poker in the middle goes by the name of the "pistil." Now in order that the flower may be properly fertilised, it is essential that some of the grains of golden pollen should be transferred from the stamens to the end of the pistil, which latter is also called the "stigma," being naturally sticky, and therefore well adapted to retain the pollen. I have chosen these particular flowers for examples as they



Section of Crocus, showing stigma
and stamens.

are somewhat simple in their construction, and for the same reason I show here also an illustration of a crocus, in which we may see the dark pistil, with the stamens grouped around, as they stand naturally inside the flower. If we examine other flowers we shall find an infinite variety, both

in the number and shape of the stamens, as well as in the structure and arrangements of the stigma; but the above explanation, though brief and to a great extent devoid of detail, should be sufficient for our present purpose.

We see, then, that a single blossom contains all the parts necessary for fertilisation, and that, unlike any member of the animal world, it is therefore complete in itself for purposes of reproduction, so that we might be inclined to wonder why Nature has not so arranged the position of the pollen in every flower

that it may drop straight on to the stigma, and thus complete the process of fertilisation satisfactorily on its own account, without having to be dependent upon the good offices of external agents, as we shall see to be in reality the case.

But Nature's methods are deep, and her plans well laid; and she knows that it is, as a rule, of the utmost benefit to a flower to be fertilised by the pollen from *another* blossom (of the same species, of course) rather than by its own, and therefore each plant is constructed with a view to the accomplishment of this object. It is quite easy to see the force of this advantage if we refer again to the animal world, in which it is always of the greatest importance to introduce "fresh blood" from time to time into a stock of fowls, or anything else, in order to keep up the standard of the breed and avoid degeneration; and every careful poultry-keeper will take precautions to see that a cock is no relation to the hens with which it lives, whether he keep them for show or for utility purposes alone.

Thus Nature has to consider this matter also, besides the point of actual fertilisation; and has, in addition to her other duties, to take measures to prevent a flower being fertilised by its own pollen. This is quite a simple matter with certain plants, for they make a distinction in the sexes of their flowers, having separate forms for the male and the female, as in the case of the nut-tree, the male alone bearing the pollen in such instances, so that there is no possibility of the business being mismanaged. But since, as we have seen, the majority of plants contain the two sexes in one and the same blossom, some device is necessary if it is not to be fertilised by its own pollen. How is

this purpose to be accomplished? In the simplest possible manner, although Nature alone could have hit upon the expedients which she employs in various cases to effect her object; and, as is frequently the case with a difficult puzzle, when we see the solution, after much bewilderment of mind, we marvel that it never struck us sooner.

The blossom of a plant is a piece of ingenious machinery, which never gets out of order until its work is done, and never requires oiling, each part performing its allotted duties with consummate ease, and all working together in perfect harmony for the accomplishment of their one great goal—the perpetuation of their species. This is the great law which dominates the whole of the animal and vegetable kingdoms; the one object of every beast, bird, insect, or plant—everything, in fact, which has life. And likewise the one and only aim of each blossom is to obtain fertilisation as a means to the end, and to obtain it, moreover, in the manner most advantageous to its offspring; for there is no doubt that a flower will produce better seed if it is supplied with other pollen than its own. It is with this purpose that the complicated pieces of machinery which form the blossoms of every plant are constructed, and which we will consider more in detail in another chapter.

In some plants, such as the Foxglove, the process is quite straightforward, and the method so simple as to be almost laughable; for the pollen of the flower in such cases becomes ripe some time before its stigma is ready to be fertilised, and therefore the pollen is all carried off to some other flower before the stigma of the same blossom is properly developed; then, in its turn, the stigma ripens, by which time it

is in no danger of being fertilised by its own pollen, for the simple reason that there is none of it left, and the coast is accordingly left clear for somebody else's pollen to be brought to it! Meanwhile, its own pollen has performed the same good turn for the stigma of another flower.

The accompanying photograph of four foxglove

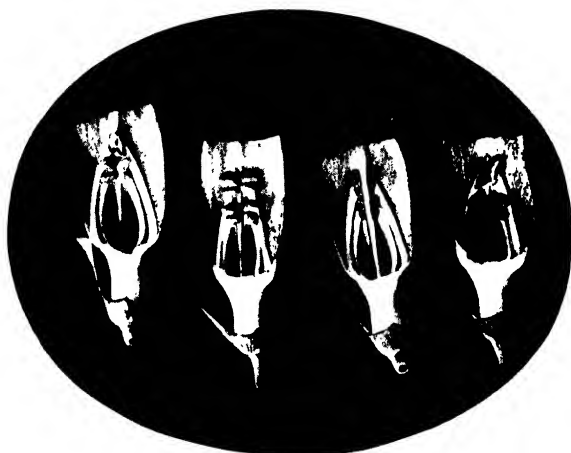


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Sections of Foxglove blossoms.

blossoms, with most of the outside cut away, will illustrate this process. Fig. 2 shows a blossom before any of the pollen has gone, and eight well-filled, plump bags of it we can see grouped around the stigma, the point of the latter being only just visible as it peeps out at the top. Fig. 3 shows a flower after all the pollen has been shed, and only the empty sacs remaining; while the stigma has grown to full development. Figs. 4 and 1 show intermediate

stages—the former with two sacs empty, and the latter with only two still full.

In discussing the foxglove, we have spoken glibly of the pollen having “performed the same good turn for the stigma of another flower,” without, however, having vouchsafed any explanation as to how it was possible for the pollen to *get to the other flower*; and, indeed, we may well wonder how it is possible for a plant, incapable of motion, to effect this exchange of pollen with its friends.

The difficulty may justly appear to our limited intelligences to be insuperable! But that Nature has satisfactorily surmounted it we need no proof: the constant increase in the luxuriance of vegetable life around us gives us assurance of the fact; but if we prefer to dispense with generalities, and to consider individual cases—to choose some particular plant and watch it carefully—we shall derive untold pleasure and wonderment from the mysteries that will be unfolded before us. And when we have worked out the solution to our problem, we can apply an analogous explanation to other cases; and we shall thus, slowly but surely, acquire a fuller acquaintance with the mysteries of Nature's problems.

This necessity for a plant to be fertilised before it can produce healthy seeds was first brought home to me by an interesting experience, which occurred one Spring, when I was about twelve years old. During the preceding Autumn I had found some young caterpillars of the Lappet moth; and, as it is the habit of this species to pass the winter in the caterpillar state, in a kind of trance, neither moving nor eating (there being, of course, no leaves for them to eat, and therefore no object in wasting their time and

strength over aimless wanderings), I determined to establish the brood upon a plum-tree in the garden. I therefore covered up the bough with a large bag of muslin, in order to prevent any possibility of the young caterpillars escaping when the approach of Spring should tempt them to make excursions abroad in search of forward leaf-buds. This device I knew would keep them safe until my return from school, for it would be impossible for any birds or other enemies to effect an entrance through the prison walls, and, at the same time, the caterpillars within would be in as natural a state as was compatible with safe custody.

The experiment proved an unqualified success as far as the caterpillars were concerned ; but the strange feature of it was the effect it had upon the *tree*. Now it so happened that we were then embarking upon a season which afforded but a sorry prospect for the ensuing plum-crop ; and this whole tree could only boast of some two dozen blossoms scattered about over its entire extent, while there was a correspondingly poor display on the other trees in the garden. The more striking, therefore, was the contrast afforded by the bough which had been used as a nursery for the infant caterpillars, inasmuch as it produced a wealth of flowering clusters that was a sight to behold, presumably because it had been protected from the cold by the muslin bag around it ; and, viewed from a distance—for I took the bag off for a few minutes, in order to get a better effect—the branch presented the appearance of being literally covered with snow as it stood out conspicuous among the practically flowerless branches on the rest of the tree !

On counting the blossoms, there proved to be considerably over a thousand upon that single branch, although it was not more than 3 ft. long ; and I much regret that I had not taken up photography in those days, for the subject would have afforded a unique picture. I replaced the bag at once, having removed the caterpillars to another bough, upon which the young foliage had made a fair start ; for I imagined, in the innocence of my heart, that if I were to continue to protect the blossoms from destructive chaffinches, my efforts could not fail to be rewarded by a magnificent show of fruit ; and I even went so far as to place a sturdy prop beneath the branch, in order to prevent it from being broken by the weight of the fruit, which I confidently expected to result from so lavish a display of bloom when the season came round.

“Do not count your plums until they are ripe” is an adaptation of a trite saying which might usefully have been suggested to me.

When I came back for the summer holidays my first visit was to the plum-tree. The beautiful white blossoms had, of course, long since vanished, and were replaced by the green foliage, which had, indeed, so crammed up the interior of the bag that I had some difficulty in lifting that article off without breaking the twigs. What was my astonishment, on doing so, to discover that there was not a single plum to be seen, in spite of the fair promise of the preceding holidays ; and a closer scrutiny revealed, to my intense disappointment, that the bough was indeed absolutely bare of fruit, although, when I looked at the rest of the tree, I saw that a large proportion of the two dozen or so of blooms, scattered over the



Bunch of Hops.

other branches, were already transformed into hard green knobs, as a foretaste of the fruit to come!

Thus had I unwittingly defeated my own ends by keeping the branch imprisoned within its muslin custody; whereas, if I had but left it uncovered as soon as I discovered the mass of white bloom and scores of opening buds, the pollen would soon have been ripe, and there might have been some chance of my dream of fair fruit being realised.

Now, although I have not yet explained "how it is done," this incident has afforded us a satisfactory proof of how unlikely it is that a flower will be able to secure fertilisation, either by chance or by means of its own unaided efforts; so that, unless Nature were to come to their rescue, they would indeed be in a sorry plight. In the instance I have just related, her designs were thwarted by the presence of the muslin bag and the strong ash prop which I had put there to support the bough—the former effectually preventing any external agents from visiting the flowers, while the latter precluded the possibility of the bough being shaken by the wind. Now, why the presence of such devices should have proved fatal, albeit placed there with the best intent, we shall see in the next chapter, where we may give a few minutes to consider how Nature effects her great object when left to herself.



The nursery of the Elm. A leaf-bud may be seen at the end of the twig.

CHAPTER V

WINGS OF THE WIND

THE fertilisation of flowers is effected, as we have just seen, by the pollen of the flower being transferred to the stigma ; and, since we may take it as a general rule that flowers are incapable of doing this for themselves, they must be provided with a messenger brigade who will do it for them. Nature never makes a mistake, and undoubtedly she would have fashioned the blossom in some such way as I suggested in the last chapter

if she had not expressly intended to manage the business in a totally different manner ; for it would indeed be a grievous mistake to create a lovely plant and give it no means of perpetuating its species for the delectation of succeeding generations.

There are two kinds of messengers employed for the performance of this service, both very familiar to us. One of them is howling outside my window now, perhaps in order to draw my attention to the extremely untidy assortment of dead leaves and twigs which he is vainly endeavouring to pile up on the window-sill—vainly, because as fast as he gets a few of them on the top of each other, one of his brethren sweeps round the corner and bustles them all away !

The blast of Boreas, the South Wind mild,
The soothing Zephyr, and the East Wind wild

are the quartette who do a lot of Nature's work for her, although not by any means do they share the labour equally.

These gentlemen are not only instrumental in conveying the *seeds* along to their destination, like so many patent flying machines, but they are also very useful in the rôle of pollen-bearer ; in fact, it is exclusively by their means that the flowers of some of our big trees, and also certain herbaceous plants, obtain fertilisation.

Have you ever noticed that the flowers of the Elm or Ash come out before the leaves appear ? This is one of Nature's wise provisions so that the wind shall have fair play, for the blasts of air can thus filter through the branches and get hold of the pollen much better than if the flowers were cramped up amid a mass of concealing foliage.

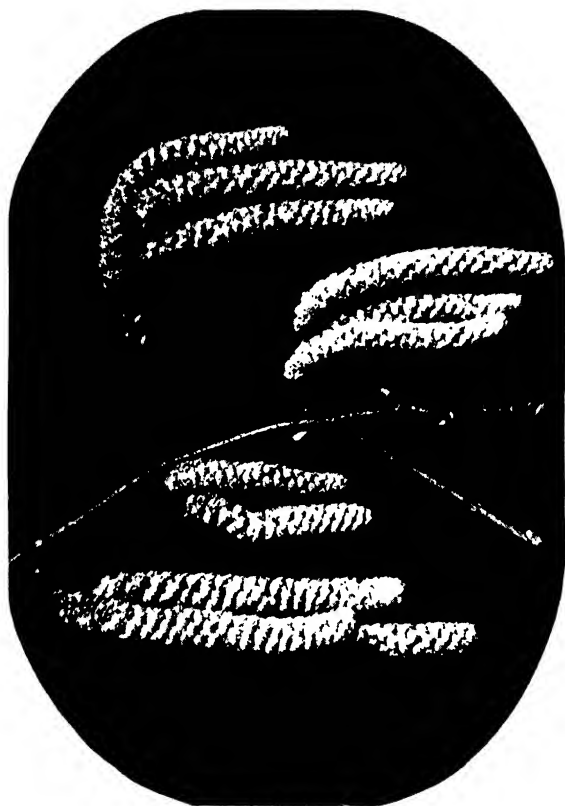
One of the illustrations shows a twig, covered with the leaf-like seed-pods of the elm, at the extreme tip of which one of the genuine leaf-buds can be seen ; another depicts the curious blossom of the ash ; while a third—which may be seen at the end of the chap-



Flowers of the Ash.

ter—gives a picture of the more delicate blossom of the oak-tree.

What a wealth of golden dust will shower down upon your hand from the pretty "catkins" on the Hazel bushes if you give the bough a shake ! This is the pollen, which is waiting for a similar disturbance from a ministering puff of air, giving it a chance of exercising its fertilising powers.



Male flowers of the Hazel.

Now the hazel possesses a specially interesting feature, inasmuch as it bears two distinct kinds of flowers, which, oddly enough, may be found growing upon the same twig. The beautiful catkins are the male flowers, whereas the female blossoms are small and insignificant.



Female flowers of the Hazel.

It is a very popular notion that a good show of catkins on the hazels betokens a heavy crop of nuts in the future; and I have frequently heard the exclamation "Just look at those catkins! We are going to have a fine crop of nuts this year," or words to that effect. But it by no means *necessarily* follows that a grand display of catkins will result in a good crop of nuts. *Not one of those catkins will ever produce a nut,*

any more than a Highland bull could give birth to a calf!

If we desire, however, to find the flower that *will* produce a nut—provided, of course, that it is first properly fertilised—we must search the branch for a small object, something like a leaf-bud, only adorned



Buds of the Sallow. "Pussycat's Claws."

with tiny crimson spikes. This is the female flower ; and the crimson spikes on the end of it are the stigmas, which, if fertilised by the pollen from the catkins, will in due time produce a cluster of nuts.

I have here reproduced photographs of two twigs from a hazel bush, the one bearing the catkins or male flowers and the other having the small female

blossoms, the spikes of the latter being quite discernible in the illustration, though unfortunately the crimson colour does not, of course, come out.

Another plant with distinct male and female flowers is the Sallow, which bears the beautiful golden "palm," as the male catkin is called, and which generally makes



Male.

Female.

Flowers of the Sallow or "Palm."

its appearance about Palm Sunday. These blossoms, when in bud, are the velvety "Pussycat's Claws" of our country lanes, and get their name from the silky down with which they are covered before the golden pollen appears. The female flower is quite insignificant, owing to the lack of the brightly coloured pollen,

The first of the accompanying illustrations shows a sprig of the pretty "Pussycat's Claws"; and in the other may be seen two sprigs of the flower,

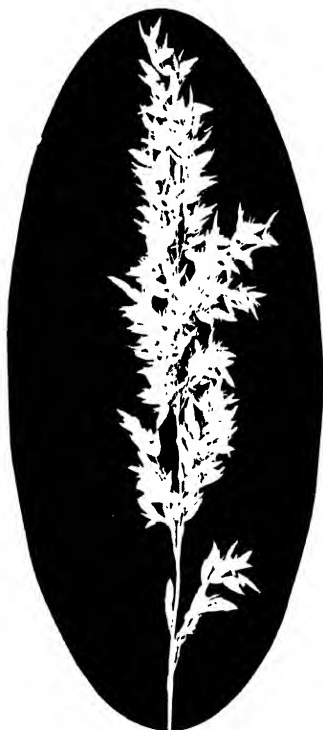


A blade of grass in flower.

male and female; of which the latter is on the right.

There is an interesting difference noticeable between this plant and the hazel; for whereas the latter will

produce both the sexes on the same bush, and even on the same twig, the willow, on the contrary, keeps the sexes rigorously distinct, and they are never by any chance to be found upon the same bush.



The same blade of grass in seed.

Grasses of all kinds are to a great extent fertilised by the agency of the wind ; and we may notice how, with this object, each spray is widely spread out, when the grass is in flower, in order that the wind may reach the pollen, but closes up when it is ripe,

and no longer requires the services of the messenger brigade. This peculiarity is most strikingly shown in the accompanying illustrations of the *same* piece of grass taken in flower, and again in seed.

Now there is another brigade of messengers wearing Nature's livery, in the form of insects. Bees, moths, flies, and others are pressed into the service; and it is upon the good offices of such agents that the majority of plants depend entirely for fertilisation.

"The ceaseless hum of the honey-laden bee," as he hovers from blossom to blossom, does not only mean that he is having a "jolly good time" on his own account—although undoubtedly our friend the bee looks upon everything through honey-coloured spectacles! By no means! The flowers have an eye to business, and they take good care that Mr. Bee does not run off with their honey without doing them a service in return; and, consequently, they do not allow him to so much as taste their store of sweets, without compelling him to take off upon his unsuspecting back a good load of their pollen, which he would be sure to rub off upon the stigma of another flower, as soon as he entered it!

Furthermore, the individual bee, by a remarkable provision of Nature, will usually show a decided preference for a particular kind of flower, and thus will keep more or less to the same species—thus ensuring the fertilisation of a much greater number than would be the case were he to wander about promiscuously sipping every species he passed. Moreover, when we consider that the busy worker is hard at it during the whole day, from sunrise to sunset, when once the drink-craze is on him, we may

imagine what a vast number of blossoms must profit by his ministrations in the course of the day's work ! We must have often noticed a stout bumble-bee buzzing along, so smothered in pollen that "his own mother wouldn't know him," on his way from flower to flower.

I remember an amusing story in this connection, at the expense of an enthusiastic clerical botanist, a friend of my parents, when we lived in Yorkshire. The gentleman in question was a great orchid-grower, and he had in his greenhouse a large number of very valuable plants, taking an infinite amount of care to keep the species distinct. With this object, he kept his houses rigorously "bee-tight," lest any stray specimen should find an entrance, and spoil his labours by mixing the pollen of his precious orchids.

One Sunday morning, when the worthy pastor paid his usual visit to his orchid-houses, shortly before the time when he was due to set off to perform his customary duties at the church across the road, to his horror, on opening the door, his ears were greeted with the monotonous buzzing which proclaimed that a wandering bumble-bee had somehow managed to get in, and goodness knew what damage the insect might have already accomplished ! Catch that bee he must ! Accordingly he set to work with a will, rushing wildly all over the place in hot pursuit.

The merry peal from the old church tower gave place to the deep monotone that preceded the opening notes of the voluntary by three minutes only, and still the frantic pursuer kept up the chase, until at length the last note of the bell had ceased

to clash discordantly with the voice of the organ, which was already vibrating through the old church-yard. Another moment, and the excited form of the white-haired verger appeared on the scene of the conflict: "The voluntary's begun, your riverence." "Can't help it, Thomas! I must catch this bumble-bee." The rustic organist played through all he knew, and played it through again. Then came one of the churchwardens, anxious lest his spiritual pastor had been taken suddenly ill: "The congregation's waiting, sir." "Let them wait," was the despairing reply; "I can't have that hundred-guinea *Cattleya* spoiled, if they have to wait all the morning!" And wait they did, until at length the combined efforts of the trio had succeeded in securing the intruder; and, by the time the organist had begun his repertoire for the third time, and was in despair as to what he should do next, the panting and perspiring form of the worthy parson rushed into the vestry! History does not relate what the reverend gentleman's sermon was about, but I should fancy it must have been a bit disconnected!

Now, in the consideration of this problem of fertilisation, the question upon which the whole matter hangs is this: how can any flower compel its visitor to dislodge the pollen from its bed, and prevent it from pilfering the honey without doing so? In various and wonderful ways, which are much too numerous to treat exhaustively here; so I propose to take a few of the more remarkable instances only, and will endeavour to explain the respective methods by which these particular flowers attain their object.

But we must have a few generalities first, to pave the way, as it were. In the first place, then, we must carefully remember that Nature's sole intention, in endowing a flower with honey, is to attract the insects that fertilise it ; so do not let us imagine that her primary object is to lend enchantment to our breakfast tables—any more than holly berries were created to gladden our eyes, or provide nourishment for the birds ; although they *indirectly* serve these objects as well. For the same reason, the sweet scent of certain flowers, and undoubtedly their bright colours also, are designed to attract the insects from a distance.

Nor must we suppose that *any* flower is fertilised by *any* insect. By no means. Just as every lady will have her own particular taste in matters of dress, so will each flower show a penchant for a particular kind of insect. So we shall see that each species will have its own staff of attendants, and to these alone will it permit access to its stores of honey, and consequently by them alone is it fertilised ; and it is in order to effect this object that such wonderful devices are employed by different plants, whereby they render it impossible for any but their own particular insects to obtain entrance ; and those who do not possess the pass-word may try in vain to find admittance to the sacred portals.

The flower has to guard against thieves, and it would not suit her book at all for any stray tramp to get in and ravage her larder, without doing her any service in return—for instance, if a certain plant is usually fertilised by a bee, it would not do to allow an ant to creep in and steal the honey.

Let us first consider a few of the efforts made by the members of the floral world to *attract* the *welcome* insects; and we can then go on to discuss a few instances of the methods by which the flower attempts to guard against thieves.



Flower of the Oak.

CHAPTER VI

WELCOME VISITORS

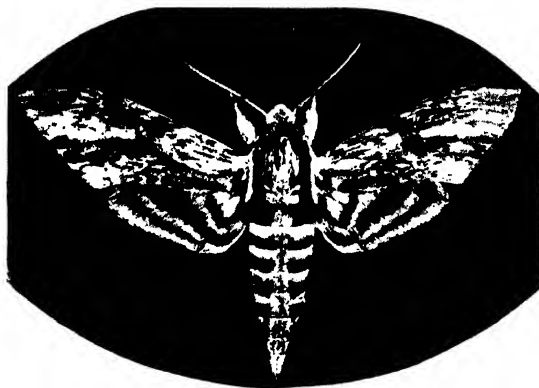
LET us now pass on to the consideration of welcome visitors, and see what kind of society is cultivated by certain species of flowers. And I need hardly say that our friend the Busy Bee is in great request among the floral tribes, and that the majority of well-regulated houses are only too pleased to receive his kind attentions and to pay him liberally for his services. But there are a certain exclusive few who consider him common and vulgar in the extreme; and should he venture to the door of any such house—however entrancing may be his smile as he presents his visiting-card—he will assuredly receive the cut direct!

In this chapter we will take one or two instances of those flowers which prefer the society of moths or flies before giving our attention to the bee-worshippers, of which latter by far the greater portion of the community is composed.

A particularly good instance of such fastidious plants is to be found in the case of the Tobacco-plant, or the Evening Primrose, which latter, as its name implies, remains closed all day and opens only at dusk when the moths begin to fly. The tobacco-plant is fertilised by the great Hawk-moths; these insects

being provided with a proboscis, or tongue, of enormous length, which they shoot down the long tube of the flower. This is the reason of the fact—which we all must have noticed—that these flowers literally “shut up shop” during the day-time, when the Hawk-moths are asleep, and when the bees or

Tongue of another one.



The Convolvulus Hawk-moth.

other undesirable creatures might creep in and steal the honey. For the same reason these blossoms emit a powerful scent—which, however, is hardly noticeable during the day-time—in order to signal their whereabouts to their welcome friends.

The illustration shows a pinned specimen of this beautiful Hawk-moth ; and the tongue of another one is depicted above it, partially uncurled. The length of this insect's tongue is prodigious, and often reaches to a distance of several inches ; as, indeed, is not to be wondered at, considering that it has to stretch down the whole length of the tobacco-flower tube

before it can get to the honey at the bottom. Well do I remember my first introduction to this grand insect, when I was a small boy, and being much mystified by my father coming in from the garden and telling me that he had met a lady with such a long tongue that when she put it out she had to roll it up again before she could get it back into her mouth; and when he took me into his study to see her I was still more surprised to find no sign of any one: but the astonishment was succeeded by delight when I caught sight of a huge moth fluttering within a large bell-glass, in wild fury that any one should have had the presumption to imprison it! My father placed a drop or two of sugared water inside, and I had the satisfaction of seeing the insect uncurl and steep its long tongue in the agreeable compound.

We may notice that such flowers as the tobacco-plant and the evening primrose, and other species that are specially adapted to be fertilised by moths, are generally pale in colour, so that they are more conspicuous in a subdued light, and also that they usually emit a much stronger odour at night—an admirable device, for moths possess peculiarly well-developed organs of scent; more so, in fact, than bees, which appear to rely much more upon their eye for colour.

We naturalists trade upon this susceptibility on the part of moths; and the moth-catcher finds it an effective plan to mix some strong-smelling ingredient in the compound which he is wont to plaster upon the trees at dusk in order to attract the unwary moth. I have a bottle of essence of Jargonelle pear; and if these words should meet the eye of a fellow entomologist, let me advise him to get some too, and give it

a good trial, and I think he will find it will answer much better than rum, or methylated spirits, or anything else of the kind. It is expensive stuff, but a very few drops suffice to impart a powerful and delicious odour to a large pot of the "sugaring" mixture.

Ivy-blossom, again, proves very attractive to moths ; and this fact is well known to the "bug-hunter," who may often be seen around the ivy-bushes in late Autumn. Many a rich haul have I made myself, perched on the top of a ladder, half buried in a huge mass of ivy-flowers, and well-nigh chilled to the bone. I would cling on, as the night grew colder and colder, to my precarious position, in the hope of another rare catch, my numb fingers well-nigh refusing to grasp the killing-bottle ; shivering anew, as each fresh trickling drop made its icy channel down the back of my neck, inwardly groaning at the thought of the glowing logs which I knew were spluttering and crackling on the blazing hearth—so near and yet so far !

Surely the mad infatuation of the moth-catcher—which only those who have tried it know—must be something akin to the craving of the drunkard or the gambler, who continues in his mad carouse far into the night, heedless of time and every other consideration. Verily the comparison seems an apt one ! For, just as the drink-sodden wretch goes on until his pockets are empty or he is bodily chucked out, so is the moth-catcher eventually compelled to drag his weary footsteps homeward, owing to the failure of the supply of either his "mixture" or his light, or because he has no space left in which to bestow his captures, by which time—in my own case, at any



Ivy blossom.

rate—it has often been nearly 2 a.m., and I have been almost too dazed, on arriving home, to grope my way to the larder and search for what I could find to satisfy the aching void that reminded me persistently that it was nearly six hours since I dined; and then to scramble into bed. And didn't I pay for it the next day, with heavy head and blinking eyes! But I felt rewarded when I surveyed the rows of valuable beauties outspread upon my setting-boards, some of which were of extreme rarity.

While on the subject of setting-boards, I must mention, as a warning to others, a misfortune which I once had with a lot of rare specimens. I had set these specimens upon three loose boards, owing to the fact that my regular setting-case was full, the result of several successful sugaring expeditions on consecutive nights; and I placed the boards, with their precious burden of some thirty-five moths, which happened to be nearly all of considerable value, in an empty drawer, until the insects should be ready to come off.

The following morning, when I looked in, the scene of havoc that met my eyes was truly piteous. A wicked mouse had managed to get in at the back of the drawer, and had proceeded to regale himself with the contents; and, judging from the appearance of wholesale destruction—wings scattered about all over the place, heads here, bodies there, legs everywhere—the little sinner might have been having a game of football with them!

There were but three specimens left unscathed in the whole drawer (and any entomologist will sympathise with the extent of the loss, when I mention that the victims included exquisite series of

Agrotis cinerea, *Aventia flexula*, and *Neuria saponaricæ*; besides single specimens of such species as *Notodonta dodonea* and *dictæoides*, and *Leucanæa straminea*!). The bitter irony of the whole thing was that the two or three specimens, which had been *spared* in the general destruction, were quite common insects, which I had set for the benefit of a boy who was beginning to collect, and had asked me to give him a lesson in the art!

It was, indeed, a lesson which I have never forgotten!

Mice are amongst the worst enemies with which insect collectors have to contend; for, even if they do not demolish the insects right away, they will give surreptitious nibbles, which are quite sufficient to spoil the beauty of the moth as a perfect specimen. To chrysalides these little thieves are particularly partial, and will make short work of any that they may come across; and, what is more, they seem to possess a unique power of discovering where the young collector keeps his treasures; and I would therefore warn such a one of the possibility of his finding a small hole in the corner of the breeding-cage one fine morning, unless he keep his weather-eye very wide open; and, in this case, he need not expect the legacy of the ravager to amount to more than two or three empty shells, which he thought he could not digest! Only the other day I had a letter from a correspondent in which he bitterly bewailed the loss of a beautiful brood of rarities, cleared off in a single night!

In the accompanying illustration I show a head of the delightful blossom of the ivy, beloved of winged insects; and it is indeed a pretty sight to watch a

moth besporting himself upon some such cluster, hovering the while with a total absence of effort, his glowing eyes shining in the dark like red-hot coals! So engrossed is he in sucking up the nectar with his graceful proboscis, that he appears to be entirely oblivious of human presence—in fact, he is so wrapped up in the occupation, that he will allow himself to be tapped off with the finger into the pill-box held underneath for his reception!

Another flower which exercises its wiles for the attraction of moths is the white Campion; and we may notice that, with this object, it gives forth quite a fragrant scent when evening draws near, although its odour is scarcely noticeable during the day-time.

There is one very remarkable instance which we must not pass by without an introduction. I refer to the "Lords and Ladies," beloved of children, whose tender leaves are well-nigh the first green shoots to force their way up through the ground, when the spring sun begins to thaw the frost-bound earth, which had kept them imprisoned during the winter. As children, we used to keenly enjoy picking the green spikes containing the embryo flowers,—one of which is depicted in the illustration,—without waiting for them to open naturally; and what fun it was to guess which would be lords, and which ladies! And then the unfortunate things were peeled open to see! The white ones we called ladies, and the pink ones lords; and great was the discussion as to the fancied sex when we opened one which partook of both colours, as occasionally happened.

These interesting plants belong to the same family as the glorious Arum, which plays so prominent a



White Campion.

part in our churches at Easter-tide ; and it is not altogether unlike it, if we substitute a green sheath for the white one of the Arum, and a pink "appendix" for the golden one of the Arum.

I reproduce here a photograph of a wonderful freak, which occurred in my greenhouse last winter, one of the Arums appearing with a pure white leaf of exactly the same texture as the flower, both growing together on the same stalk, as seen in the illustration.

The correct name of the Lords and Ladies is "Cuckoopint," and the flower is fertilised by small flies. Moreover, the method by which the flower accomplishes its object is most curious, and the accompanying illustrations of some specimens, with the outer sheaths removed, will help to make the explanation clearer. In Fig. 1, I have shown an unopened specimen (at the stage when we used to peel them!) and the mature open flower..

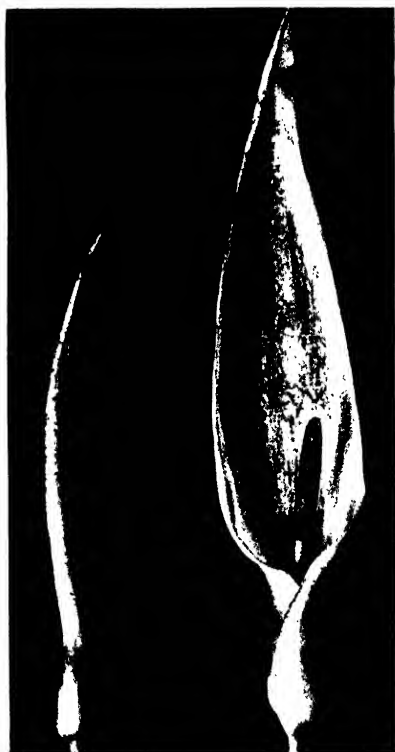
Fig. 2 shows a specimen, natural size, and completely stripped of its outer sheath ; and at this I will ask my readers to look for a moment.

At the base of the narrow neck will be seen a number of hairs, or filaments (c), arranged so as to point downwards, in order that the small flies which creep in (for shelter or any other reason) can push their way down without difficulty ; but they then find themselves caught in a unique trap, and quite unable to force their way up again through the barrier of points that faces them from above ! So they have perforce to "grin and bear it"—if flies can grin—and there they remain, amusing themselves as best they can until the flower chooses to open its prison-gates ! Fig. 3 (z) shows how



An Arum freak with white leaf, of similar texture to the blossom.

closely the filaments fit to the sides of the sheath, and also a number of the captives scattered about in the bottom of the prison.



Bud.

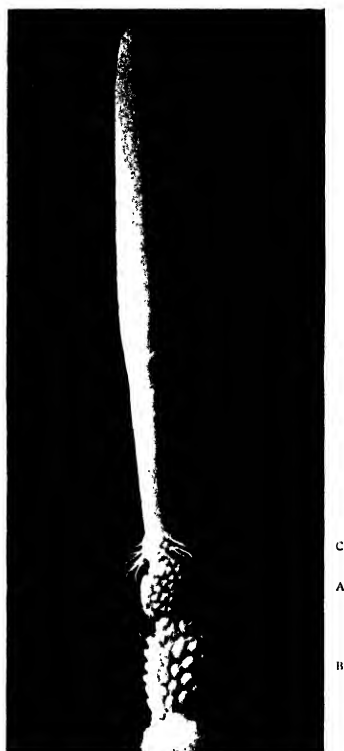
Open flower.

Lords and Ladies. Fig. 1.

Let us look again at Fig. 2 for the explanation of the *modus operandi*.

In this photograph A represents the stamens—which, however, hardly deserve the name, being so

small and insignificant—and B are the stigmas. The poor prisoners have to ramp about in the narrow space between A, B and the wall of the sheath,



Inside.

Lords and Ladies. Fig. 2

unable to pass C, until the pollen contained in A is ripe ; then this drops upon the flies, and sprinkles them all over. The latter have scarcely recovered from their astonishment at the involuntary shower-

bath, when lo! another surprise is in store for them, for they discover that the gate of their dungeon is unlocked! C has shrivelled up, and disappeared; and the captives are free!

Fig. 3 (V) shows the flower at this stage; and the difference will be at once apparent if it be compared with the flowers on either side, taken before the shrivelling of C.

All the rest of the flower, except B, soon withers;



Sections.
Lords and Ladies. Fig. 3.

and the latter gradually swells and ripens, developing at last into the lovely scarlet berries which are so conspicuous in our country lanes in the Autumn, and which are shown in the illustration Fig. 4.

The fly is a foolish creature, and very credulous, and he is much more easily taken in than his cousin Mr. Bee.

Some flowers trade upon this weakness—to wit,

the exquisite Grass of Parnassus, which grows in profusion in swampy pastures in Scotland and the North of England, being also occasionally found in one or two favoured spots in the South.

This wily plant—which is not a “grass” at all, as its name signifies—wishing to attract flies, without incurring the expense of providing them with honey as a reward, therefore holds out conspicuously five little shiny knobs, to delude the silly flies into the belief that they are drops of honey! The flies are completely deceived, and the object of the flower is attained!

There are even more ingenious devices to be found amongst tropical plants, some actually going so far as to simulate the smell of bad meat!



Fig. 4. Seed of Cuckoopint, or “Lords and Ladies.”



Crocuses growing in grass.

CHAPTER VII

"THE BUSY BEE"

UNDOUBTEDLY the member of the messenger brigade who finds most favour in the eyes of the parents in Flora's nursery, is Mr. Bee ; and we shall find that the majority of flowers seem to consider his services quite indispensable.

Such species will do all in their power to attract the ministering insects ; and the lengths to which they will go, with this object, are at times astonishing ; and,—as we shall see further on,—they are, at the same time, just as keen in repelling those creatures whose services they do not require.

The beautiful golden Toadflax, or Wild Snapdragon, as it is often called, is a first-rate example ; and, of course, similarly the many garden varieties of *Antirrhinums*, whose rich colours find a place in most flower-borders. As for the Toadflax, it comes up like a weed in my kitchen-garden ; and, as its lovely gold and orange spikes are so useful for decorative purposes, it is permitted to come up at will among the cabbages and Spring onions.



The Toadflax. The flower is only opened by the weight of the
bumble-bee.

I have often watched the bees visiting these flowers, and the process is very amusing, and most instructive.

We notice in the illustration that each flower is completely closed up, in such a manner that nothing can get inside ; and if we examine a living specimen, we shall see that the upper part of the blossom is shaped very much like the mouth of a fish, and will open and shut in the same way, if we force it to do so. Moreover, it never opens of its own accord, owing to the fact that the lower "jaw" is provided with a sort of spring, designed to keep it permanently closed ; so that, however often it is pulled open, it will shut again with a snap, directly it is let go.

Now we see the beautiful arrangement of this complex mechanism. The flower is fertilised exclusively by the bumble-bee, and its construction is therefore adapted for that gentleman's service alone, no other insect being strong or heavy enough to pull down the lower lip ; and therefore the honey within remains sealed to all except the favoured few. The bumble-bee, being a decidedly corpulent person, is heavy enough to open the door by the sheer force of his superior weight. Moreover, he is quite alive to the fact, and seems specially fond of the Toadflax and Snapdragons,—whether from a spirit of innate wickedness, which prompts him to taunt the rest of the messenger brigade with the fact that he possesses the monopoly of this particular flower, we cannot say ! But, at any rate, he never passes without receiving the warmest invitation to stop to lunch, when he receives his meed of honey, and brushes off the pollen in the process. The Snapdragon is, in

fact, —as Lord Avebury so aptly puts it,—“a closed box, of which the bumble-bee alone possesses the key.”

There are other plants which close their doors to all comers except the bees, who alone possess a latchkey that will fit the lock ; notably the prickly Gorse, which sets our commons and heaths ablaze with golden light, and is usually considerate enough to be out in time for us to colour our Easter eggs with the dye from its yellow blossoms. We shall find, on examination, that this flower is of a decidedly peculiar shape, being also as tightly locked up as any strong-box, until the bee settles upon it ;—but on the instant that he does so, the flower flies open, and showers its pollen upon the visitor. In this instance, the blossom remains open afterwards, not being provided with the spring of the Snapdragon ; so that any robber can help himself when once the bee has supplied the open sesame.

The Sweet Pea, however, is very careful to keep the door of her larder shut. The blossom is formed after a very similar pattern to that of the gorse, and,—as will be seen from the illustration,—is furnished with “wings,” which are locked into the “keel,” as the lower petal is named in flowers that are made after this design. The bee, on alighting, catches hold of the wings with his legs, which action has the immediate effect of pressing them down, and of forcing down the keel as well. The pollen is thus exposed to view, and the bee is sure to rub some off, as he fumbles clumsily about in his attempts to get at the honey within. When he has finished, and flies off again, the wings and the keel spring up together once more, and the honey which he may



Sweet Peas. Fertilised by bees.

have left is inaccessible to anything except another bee.

Another particularly interesting flower is the sweet Primrose,—that type of our country.

In the case of this flower, Nature really seems to have gone out of her way to complicate matters, although the result is certainly very charming ;—in fact, it appears at times as if she purposely fashioned certain plants and things in a specially outlandish manner, for the sheer joy of puzzling us ! My readers may have noticed that there are two forms of blossom in the common primrose, as I have shown in the illustration ; one of which has the *stigma* just peeping out at the top of the flower, while the *stamens* are right down inside the flower, and hidden from view entirely. The other form is just the reverse, having the *stamens* level with the mouth of the tube, whereas the *stigma* reposes half-way down, and practically out of sight.

Figs. 1 and 2 give a full-face view of the long and short stigma varieties respectively. Fig. 3 shows a flower with one side cut away, so that the position of the short stigma within it may be recognisable. Figs. 4 and 5 show two flowers with their long and short stigmas respectively laid bare. In Figs. 6 and 7, I have cut away as much of the flower as possible ; so that, in Fig. 6, the *stigmas* may be indistinctly seen nearly half-way down, while the little bunch of stamens is visible grouped together at the top of the tube ; whereas, in Fig. 7, the *stamens* being half-way down, it is possible to cut away the tube also half-way down, without dislodging them ; the tube, in this figure, naturally coming up to the little ball represented by the top of the stigma.

Now the object of this device, which was first pointed out by Darwin, is as follows ;—when a bee visits Fig. 7, and thrusts its proboscis down the tube,



The emblem of Spring.

the pollen clings on to a part of the proboscis which would come exactly opposite the stigma when it visits Fig. 6 ; and, *vice versa*, when the bee approached Fig. 6, the pollen would cling to a point on the

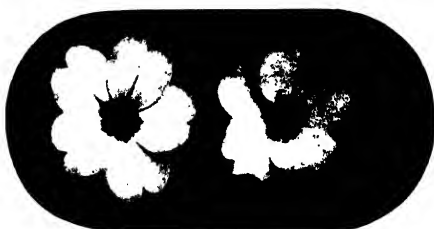


Fig. 1.

Fig. 2.



Fig. 3.

Fig. 4.

Fig. 5.



Fig. 6.

Fig. 7.

proboscis much farther up, and would then be caught by the stigma of Fig. 7, directly it touched it !

Bees are continually on the move, so that the result of this excellent plan is that each form of flower is satisfactorily fertilised.

We must not forget the dear little Daisy !

The habits of this general favourite are precisely the reverse of the Evening Primrose or the Tobacco-plant ; her very name being significant of the fact that she is wont to close her innocent eye in company with the day which she has brightened with the sweet charm of her upturned face. The fact of this "early closing" fad on the part of the Daisy means that the many moths which come out at dusk, and wander about at night, do not have much of a look-in ; and it is therefore no great step to conclude that the hat and stick which may be found in the front hall, when the daisy is at home, belong to Mr. Bee !

My lady deigns not to encourage the attentions of moths, or any of what she deems a vulgar herd--such are the vagaries of taste among the ladies of fashion ; so she promptly puts up her shutters, by folding her snowy petals as soon as the car of her presiding deity Phœbus Apollo sinks slowly in the bosom of the West, and the cooler breath of evening has warned her ardent admirers that they had better be putting on their coats and bustling homeward.

Moreover, should it be wet and miserable in the day-time, she will remain closed ; for the sun's warm smile is meat and drink to her. But this action on her part is not so much because she knows that her friend the bee does not possess an umbrella, and cherishes such a rooted dislike to getting wet that nothing will induce him to venture abroad in the rain, as from the

fact that the moisture would clog her delicate organs, and wash away the honey to such an extent that the bee would find no interest in her when he returned ; and she has no wish to "lose favour in his eyes."



Oxeye Daisy. Closes at night, when the bees have gone to bed.

The illustration shows the Oxeye Daisy, which, together with most of its relations, is addicted to the same habit of closing at dusk.

An interesting family are the Speedwells, especially the familiar little "Eyebright." The infinite blue of an Italian sky could not vie with the vivid azure of

the porcelain-like cups which she stretches out to catch the sunbeams, basking in their genial warmth, or coyly twinkling her bright little eye as the glancing rays smile upon her uplifted petals. But, mind you, it is not all flirtation ; for she has an eye to business, and, sharing the Daisy's aversion for moths and that ilk (for which reason she also shuts up at night), she,



The "Bright-eyed" Speedwell.

at the same time, has had handed down to her, from her ancestors, the knowledge that the busy bee has a special weakness for a pretty face ; or, in other words, a tremendous eye for colour (Lord Avebury mentions that bees are specially partial to blue and pink) ; and she therefore rightly conjectures that into the liquid depths of her beautiful eye he will love to gaze ! Accordingly, like a veritable coquette, she dons her

most bewitching smile—and what mere bee could possibly resist the fascination?

It is very significant that the undersides of the Eyebright's petals are quite pale in colour, and have no share of the glory of the upper surface; and consequently the brilliant blue is hidden when she is shut up for the night, and its attractiveness no longer serviceable.

The abundance of these beautiful Eyebrights amounts at times almost to a visitation, when they find their way into a garden, so rapidly will they spread. They seem to evince a special predilection for an orchard of mine; in which the blue-eyed contingent made their first appearance two years ago; and it is now not too much to say that they kindly allow me the use of a small part of my own orchard, for which, being under the trees, they have no use themselves! In these spaces I humbly plant Narcissus bulbs, and try to be thankful for small mercies! I have not the heart to turn them out. It is true that I have, at times, when feeling particularly brutal, sallied forth with an expression of determined ferocity and a garden fork, with the firm intention of steeling myself to lay a destroying hand upon the sheet of blue, that monopolises also the corner where I had been trying to naturalise a pretty Swiss Cranesbill; but as soon as I stoop to begin the work of destruction, it is more than I can do to resist the gentle pleading of those coyly blinking eyes; and I find that I have suddenly remembered an appointment, and depart hurriedly, without so much as an apology to the Cranesbills, which have to do the best they can!

Another flower which well deserves an interview,

is the white Deadnettle, a clump of whose blossoms is shown in the accompanying illustration ; and I have also introduced a series of photographs of a single blossom, taken from different points of view, in order to show more clearly the formation of this plant, and the preparations it makes for the reception of the bumble-bee.

This species has a weakness for the bumble-bee, and desires no one else ; and consequently she resorts to the most ingenious devices in order to attract and entertain that gentleman ; and, assuredly, no society hostess could show a greater concern for the comfort of her guest than does my Lady Deadnettle. She keeps a specially sweet brand of honey in her larder for his delectation,—of which indeed we need no further proof than to pull off a flower and suck the end,—the tube leading down to the fragrant store being just wide enough to admit the spear-shaped proboscis of the bee, but too narrow to admit of the entrance of the smallest of aliens, who are, moreover, also effectually shut out by a fringe of minute hairs which runs all the way round the neck of the tube (Fig. 1, A).

Then, for the further convenience of her visitor, the thoughtful hostess erects a comfortable platform (B) for him to rest upon when he alights.

Overhead we can see the stamens and stigma, which lie snugly beneath the exquisite waterproof tent provided by the overhanging arch (c). This arch serves the double purpose of protecting the pollen on the stamens from rain, being also fringed around with delicate hairs with the same object, as can be very well seen in Figs. 5 and 2,—and also to prevent the drops of moisture from getting down the narrow neck and blocking it up.

Now we have the preparations complete, and all is in readiness for the reception of the bee. Let us watch what will happen.

Here comes a huge bumble-bee, gorgeous in his



Group of Deadnettle blossoms.

Fig. 1.

Fig. 2.

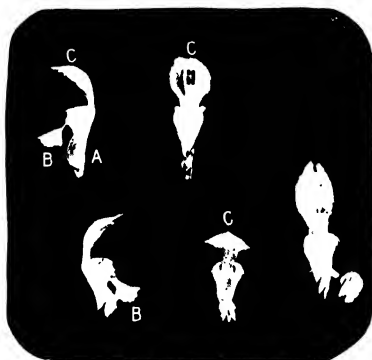


Fig. 3.

Fig. 4.

Fig. 5.

Single flower of the White Deadnettle, taken from different points of view, to show the method of fertilisation.

garb of russet and gold, buzzing away for all he is worth, in anticipation of the treat in store. He alights upon the platform, pushes his proboscis down the neck of the flower, rubbing his furry back against

the stamens as he does so,—(and we must notice that the overhanging arch is exactly the proper height to suit the dimensions of the bumble-bee),—and then he flies off to the next blossom, carrying a load of the pollen on his back, repeating the process there, and rubbing against the stigma, which is ready to receive the offering! Thus is the object of Lady Deadnettle achieved; and as the bee continues his career from blossom to blossom, every sip of honey he obtains practically means a flower fertilised!

Perhaps, however, the most marvellous phenomenon to be found among plant life is the mechanism adopted by a species of tropical Orchid, the story of which is so well-nigh incredible that I am constrained to give it before concluding this subject.

The description of this plant being very lucidly expressed by Darwin, in his "Origin of Species," from the observations of Dr. Crüger, I cannot do better than quote his own words:

"This orchid," writes the great wizard, "has part of its labellum or lower lip hollowed out into a great bucket, into which drops of almost pure water continually fall from two secreting horns, which stand above it; and when the bucket is half full, the water overflows by a spout on one side. The basal part of the labellum stands over the bucket, and is itself hollowed out into a sort of chamber with two lateral entrances; within this chamber there are curious fleshy ridges.

"The most ingenious man, if he had not witnessed what takes place, could never have imagined what purpose all these parts serve.

"But Dr. Crüger saw crowds of large bumble-bees

visiting the gigantic flowers of this orchid, not in order to suck nectar, but to gnaw off the ridges within the chamber above the bucket; in doing this they frequently pushed each other into the bucket, and their wings being thus wetted they could not fly away, but were compelled to crawl out through the passage formed by the spout or overflow. Dr. Crüger saw a 'continual procession' of bees thus crawling out of their involuntary bath.

"The passage is narrow, and is roofed over by the column, so that the bee, in forcing its way out, first rubs its back against the viscid stigma, and then against the viscid glands of the pollen-masses. The pollen-masses are thus glued to the back of the bee that first happens to crawl out through the passage of a lately expanded flower, and are thus carried away.

"Dr. Crüger sent me a flower in spirits of wine, with a bee, which he had killed before it had quite crawled out with a pollen-mass still fastened to its back.

"When the bee, thus provided, flies to another flower, or to the same flower a second time, and is pushed by its comrades into the bucket, and then crawls out by the passage, the pollen-mass necessarily comes first into contact with the viscid stigma, and adheres to it, and the flower is fertilised. Now at last we see the full use of every part of the flower—of the water-secreting horns, of the bucket half full of water, which prevents the bees from flying away, and forces them to crawl out through the spout, and rub against the properly placed viscid pollen-masses and the viscid stigma."

These are some of the ruses to which flowers resort to ensure fertilisation; and they are but a tithe of the

many, into which we cannot enter now. We must notice, however, that the special object of the efforts made by the flower is to obtain "CROSS-fertilisation"; for, although the stigma of a flower *can* be fertilised by its own pollen, as I mentioned above, it is undoubtedly more beneficial to it to receive the pollen from *another* blossom.

This point of cross-fertilisation is one of the highest importance, and may be said to be the mainspring of the gradual improvement effected by florists in all kinds of vegetables and flowers, as well as being accountable for the introduction of many new species.

Most interesting experiments can be made in this connection; and it is indispensable for a successful florist or nurseryman, in a large way of business, to possess an intimate knowledge of this science. I well remember my grandfather's head-gardener showing me with great pride, many years ago, a curious small climbing Nasturtium, of which the peculiarity was an exquisitely fragrant musk-like scent. He would not tell me how he produced the plant; but I have a strong suspicion now that he obtained it by some method of transferring the pollen from a Musk, or some suitable sweet-scented flower, to the stigma of a Nasturtium, and repeating the process during several generations, until at length he obtained a perfectly sweet-scented Nasturtium.

The enterprising gardener died not long afterwards; and I never heard whether he succeeded in establishing his discovery, or whether the secret was buried with him.

After some consideration of the usefulness of the bee—bumble or otherwise—we must agree that his

life is not wasted, and that his poetic attribute of "busy" is entirely merited; and we may further forgive him the somewhat overdone expression of importance, as he hurries to and fro, bustling about on his messages among the flowers—for Nature's nursery could ill afford to lose so valuable a servant. I was watching a bee for some time only this morning, as it clambered about among the Crocuses—which, by the way, follow the Daisy's example of shutting up at dusk and opening wide to attract the bees by day, as may be seen in the accompanying illustration; and it was really positively irritating at times to see how utterly oblivious the insect pretended to be of human presence; and even the proximity of a finger, waggled in front of his very nose, had no effect on his expression of serene indifference. But the ceaseless "Buzz! buzz! buzz!" said as clearly as any spoken words, "Do get away; can't you see that I have no time to waste on prying humans!" When we come to think of it, the bees and other things must find us an awful nuisance sometimes, and get heartily disgusted with the manner in which we interfere with their domestic arrangements, in order to satisfy our inordinate curiosity; so that it is scarcely surprising that they should at times allow an occasional hasty expression to escape them.

Now, besides this burden of pollen, I must mention a *living* passenger that the unsuspecting bee occasionally carries off with him, after a visit to a flower—a veritable "snake in the grass," which lives but to rob and despoil the poor bee of his belongings; and yet adds insult to injury by making the bee himself the bearer of the cause of misery to his happy home.



Closed at night.



Open by day.

Crocuses.

Let me, then, the tale unfold.

Many of my readers will need no introduction to a creature of villainous aspect, known as the "Oil-beetle," which runs about in Spring, and shocks our senses by the appalling effluvium of the evil yellow fluid with which it thoughtfully stains our fingers if we attempt to touch it.

This beetle is disagreeable in every way. Not a redeeming feature does it possess. It is not even elegant to look upon, and its expression betokens a degree of conceit that would be difficult to equal. It cannot even carry its body along after the fashion of any self-respecting beetle, but lumbers about, dragging this unwieldy appendage along the ground, as if every movement caused it the acutest anguish. The oily beast eventually lays a little matter of twenty-five thousand eggs in the ground; and as soon as the chips of the old block are hatched, the grubs proceed to crawl up the stalks of flowers, and hide shamelessly beneath the petals, where they lie in wait for the passing bee.

No sooner has this unhappy gentleman made his appearance—little recking, as he softly hums a tune to himself, of the vile ambush laid to compass his destruction—than the grub leaps upon his back, clinging tightly to the bee's furry coat, and is thus carried off by him eventually to his hive or nest. Here he promptly dismounts, rushes in (to the consternation of the happy family), and takes up his abode in the inner sanctum of Mrs. Bee; where he "lives happy ever after," feeding upon the poor bee's private stores of honey, and—ye gods!—her *children*!

CHAPTER VIII

PILFERERS FRUSTRATED

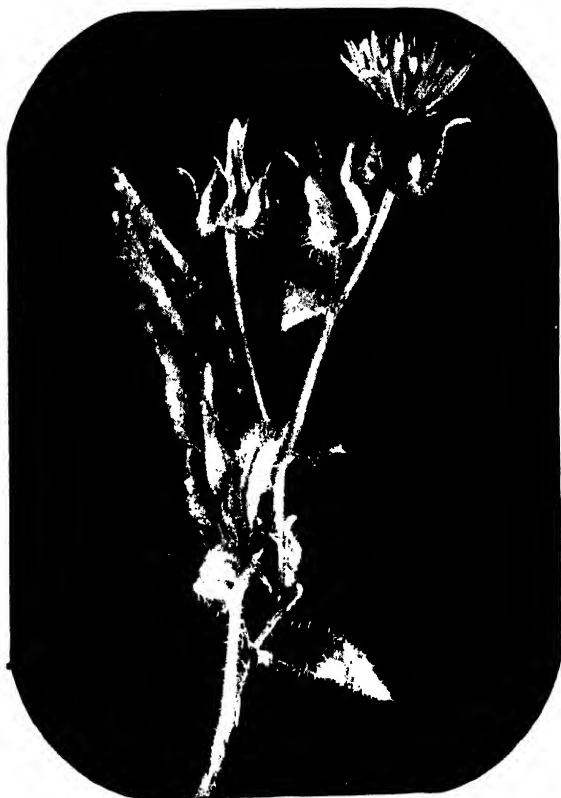
ONE of the great objects of the mothers in Flora's nursery is, as we have already mentioned, to prevent unwelcome strangers from stealing the stores of honey, which are provided solely for the benefit of desirable guests ; and therefore it is necessary for them to resort to various devices in order to keep such thieves at a respectful distance.

Now some plants protect themselves from the depredations of "creepy-crawlies" (as I used to call them when I was a little boy) by one or more rows of hairs all the way down the stalk ; and others are provided with a strong barrier of them round the stalk, just below the flower-head, and often pointing downwards ; so that an ant may crawl up to within an inch of the coveted honey, but then finds himself, after all his toil, confronted with a double row of fixed bayonets ! What he says on such occasions would probably not be printable : but, at any rate, he has to retrace his steps—a sadder and, let us hope, a wiser ant.

A case in point is that of the Bristly Oxtongue, of which I show an illustration ; the stalk of which is particularly well clothed with hairs, so strong that they almost amount to bristles.

Many plants, especially those belonging to the "labiate" family, including such species as the

familiar Deadnettle, the Woundwort, and many others, protect themselves from small insect thieves by the help of rows of tiny hairs placed *inside* the blossom ; these

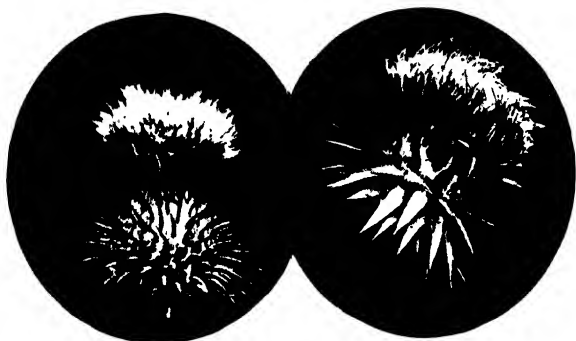


"Bristly Oxtongue."

act as an impenetrable railing, and keep the tramps outside just as effectually as the half-inch wire netting prevents the rats from getting at my baby chickens !

These hairs are intensified in the case of such crowned plants as the Thistle tribes, in which they take the form of strong spikes, for the purpose of protecting them from the attacks of small quadrupeds, which would soon eat them up if it were not for such a drawback to what might otherwise be a luscious morsel.

The sweet-scented Musk Thistle, whose head is seen in the accompanying illustration, together with one of her cousins, even possesses an additional strong fringe of spikes just below the flower-head,

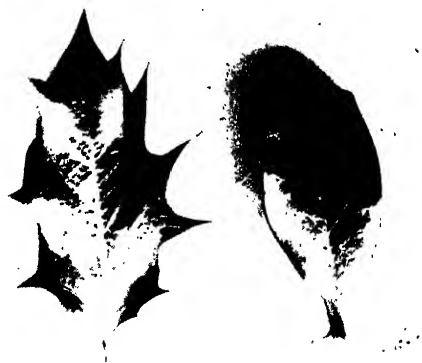


Thistle-heads and their protecting spikes.

which point downwards, as will be noticed in the photograph. Indeed, the Thistle tribe is so well provided for, that it is a wonder that they have not long ago eaten up the entire country; and rightly do they deserve the name, bestowed upon them in a former chapter, of "The Lion of Flora's Nursery!" If it were not for the incessant warfare waged against them by their greatest enemy, man, I doubt not that it would be no uncommon experience to come across vast unchecked forests of their bristly stems. But, in her relation with other natural life, the Thistle appears

to be a veritable autocrat, and Cæsar himself could not have had his way more completely ; for ministering wings hurry to convey her pollen, the wind is compelled to bear her seeds, and all intruders are kept at a respectful distance by an impenetrable barrier of barbed wire of the most approved pattern !

Similarly, the Holly protects her leaves from being consumed by browsing animals, with a layer of sharp spikes. These spikes are placed only round the edges



Holly leaves, spiked and plain, from the same bough.

of the leaves,—these being the parts with which the animal's mouth would necessarily first come in contact,—and, moreover, they point in different directions, so that an animal could not even close its mouth on the first bite without being pricked !

The most curious feature of the Holly, which effectually proves this theory, is that the leaves usually lose their spikes as the tree gets higher ; so that the upper leaves are often entirely without them ; inasmuch

as, being out of reach of all animal marauders, they do not require any such protection. My illustration shows two leaves of the same holly,—in fact, from the same bough,—the smooth one being taken from the very top, which was about ten feet from the ground; and the other from the bottom of the bough, and about two feet from the ground.

I have not space to enlarge upon the various other plants which make use of thorns, spikes, and prickles of many kinds—notably the countless tropical species of cactus. But before passing on, I must quote an amusing, as well as instructive, incident from a letter which I received from a correspondent, in this connection; and which affords, in itself, a striking example of the degree to which some of the Indian plants attain, in the pursuance of their object.

Having made mention of some interesting plant and insect phenomena, the letter continues: "... This reminds me that a lady friend, passing a 'Prickly I'ig' in flower, dismounted from her pony to examine and smell it. The flower is rather like a water-lily, and about the size of a rose. The plant is a cactus, and very spiny. One thinks of a rose *with* its thorn, but who ever heard of spines *in* a flower! She bobbed her nose down against the flower, and it was covered at once with hundreds of tiny barbs all sticking to her, like a man's beard the second day after shaving. How she suffered, and how she scolded me! She said it was all my fault, and that she would not have thought of dismounting, if I had not talked to her so much about flowers."

Such prickly objects as the Cactus, and even our own Thistles, undoubtedly owe the safety of their foliage to the ferocity of the cruel spikes with which

they are adorned, and which make most quadrupeds only too glad to give them a wide berth.

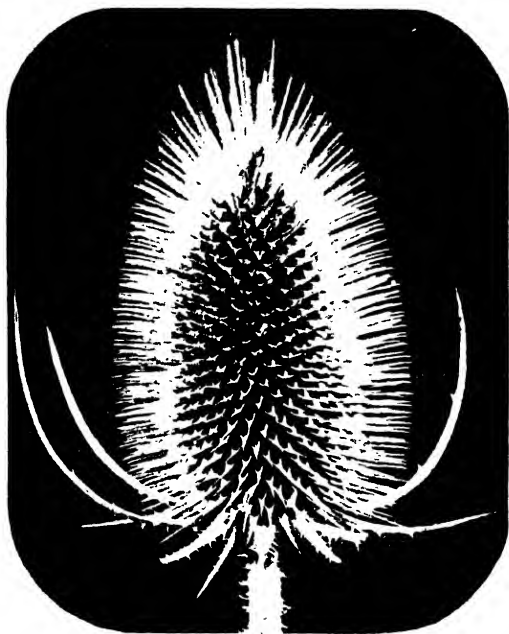
The same result is attained, only in a widely



The Giant Mullein and its velvety leaf.

different manner, by such plants as the Mullein, whose stately pinnacle of golden cups is such a charming feature of our woodland banks ; and to touch the

exquisitely soft and velvety leaves reminds one of stroking a Persian cat ! These leaves are, nevertheless, not at all beloved of animals, inasmuch as their extremely woolly nature is calculated to afford an unpleasant sensation in the mouth.



Head of the Teazle.

Certain other plants guard their blossoms from the inroads of crawling insects by means of a most clever arrangement ; and, preferring something more original than the spikes of their thistly neighbours, they accordingly strike out a line on their own account. Consequently their leaves are designed to grow in

pairs, exactly opposite each other, at regular intervals up the stalk ; their bases clasping the stalk so closely that they form a small hollow basin, in which the rain collects and remains there a long time, even in dry weather. Thus the ants, and such malignant crawlers, are prevented by means of these natural moats from making their way up the stalk ; and even should



• A natural moat. The dead bodies of the victims may be seen floating on the water.

occasional insects succeed, by the help of some adjacent twig, in clambering past one of these basins, they will probably be effectually hindered by the next.

Perhaps the most wonderful instance of this method is afforded by the Teazle, which grows wild in some of our woods. These plants flourish to such an extent that they frequently reach a height of ten or twelve feet in a wood of mine; and I often take friends in to

look at the natural moats all the way up the stalk, literally crammed with the corpses of insects of all kinds that have been caught in them.

My illustration shows one of these basins which had collected upwards of *half a tumbler* of rain,—the photograph being about one-third natural size,—and on the surface of the water may be seen floating the bodies of the victims. The leaf of the plant is also adapted to catch the rain and convey it to the well, being concave in its formation ; the deep central rib representing a water-course, and being supplied by numerous tributaries on either side.

Darwin suggests that very probably these cups of water serve a double purpose, and that, besides being intended to prevent insects from getting up the stalks, they are also designed with the special object of catching the said insects, in order that they may be dissolved by the water, and serve as nourishment for the plants. This is a theory which is, of course, open to question, but there seems no reason why it should not be the case ; in fact, it appears distinctly plausible when we remember that it is unlike Nature's methods to punish the poor "creepy-crawlies" in so cruel a manner, unless they were to serve as food for the plant as well.

At all events, whatever the object, the basins are undoubtedly effective in arresting the progress of the insects which attempt to crawl up the stalk ; and surely no mediæval knight could have felt more secure within his castle moat than can my Lady Teazle.

There is yet another expedient to which some plants resort in order to prevent insects from climbing their stalks. My readers must have noticed that the stalks of certain plants are particularly "sticky," and they have probably been too much occupied with the disagreeable

result to their fingers, after picking such flowers, to give much thought to the reason for this peculiarity. This "stickiness" is caused by viscid secretions with which the stalk is provided, for the set purpose of entrapping the unwary thief that ventures to ascend it, snaring him as effectually as though it were smeared with birdlime; so that the unfortunate beastie has frequently to forfeit its life as a penalty for its audacity.

Numbers of creeping insects perish in this way, and Lord Avebury tells us that Kerner once counted no less than sixty-four small insects on a single stalk of *Lychnis viscosa*. Here, I suppose, it would be permissible to apply the same theory, and presume that the plant extracts nourishment also in some way from the bodies of its victims, for this is certainly the case with the curious little Sundew (*Drosera rotundifolia*), a veritable death-trap, which grows in marshy places in certain parts of England. The Sundew flourishes in great profusion in Ashdown Forest, in Sussex, where it loves to twine its roots among the rich cushions of luxurious moss which grows there in great beds along the slope of the forest, through the close masses of which ooze the sluggish waters of an iron spring pregnant with rust-coloured scum, great lumps of which, closely packed, float on the surface of the water.

Ah! such moss! It is no exaggeration to say that I have plunged my arms over a foot down into its clammy depths before I could reach the roots; and that the colour thereof varies from a rich *blood-red* or *snowy-white* to an emerald green of an intensity which I have never seen in any other form of Nature. Every possible variety of intermediate shades of crimson, cream, and emerald were sprinkled about in the vicinity. I measured that moss on the occasion

of one of my visits to the spot with a pocket rule which I always have in my pocket, and it is well within the mark to say that many of the clumps were over fourteen inches in depth—all pure moss.

I cannot advance any theory to account for the



The Clover. Each flower-head is composed of a number of long tubes.

wonderful colours of this moss, unless it be owing to the unusually "iron constitution" of the thick water which permeates the vegetation with its slimy ooze of liquid rust.

Here, then, is the home of the Sundew, or Fly-catcher, as it is not inaptly called sometimes. Each of its leaves is in itself a patent fly-trap, and so sensitive

that, should any rash fly settle thereon, it shuts up, and encloses the miserable intruder in a living tomb ; nor does it open again before it has assimilated the life-blood of the wretched beastie. The leaf, moreover, is an excellent imitation of a small piece of raw meat, thus presenting a unique attraction for its victims.

Most appropriate that such a butcher should grow



Snowdrops. The slippery surface of the petals render it impossible for an ant to climb in and steal the honey.

among cushions of blood-red moss, as it does at Ashdown Forest.

Again, some species of plants exclude marauding insects by having each flower-head composed of a number of long thin tubes,—as will be seen to be the case with the Clover in the illustration—so narrow, and so completely blocked, that even an ant could not force its way in to steal the honey that lies at the bottom of the pipe, and only such a pin-like instrument as the proboscis of a bee can find admission.

Other plants protect themselves by means of slippery surfaces to their leaves or flowers, over which the insects cannot climb.

An apt example of this mode is given us by the Snowdrop in the illustration, for however often the ant may scurry up the stem (how curious it is that ants always seem to be in a violent hurry ; I never saw one yet that knew how to walk leisurely), directly he endeavours to obtain access to the flower itself, the slippery edge completely baffles him, and he falls to the ground at once, being unable to get any foothold upon the glass-like edge of the petals.

This "slippery-surface" idea is also of great use in another way, in the case of evergreen trees, their glossy leaves rendering it difficult for the snow to cling to them, and it consequently slides off. Had the leaves of such trees been fashioned with a rough surface, like those of the elm, lime, etc., the result of a heavy snowstorm would be that practically every branch would be broken off by the weight of the mass clinging to each leaf.

So we see that, by a wise provision of Nature, those trees that have not got slippery leaves always shed their foliage before the winter snows begin ; whereas the species that keep their leaves through the winter months are in no danger of suffering any harm from that fact.

With these instances I will ask my readers to be content. There are countless others, but space will not permit me to do more than touch upon even the few that we have selected for consideration.

We have already spent long enough in Flora's nursery, and must hurry on to a few others who claim our attention before we conclude.

PART IV

LESSER BEASTIES

CHAPTER I

SOME CAREFUL MOTHERS

AMONG the lesser beasties we shall find that, as a rule, the babies are left to shift for themselves as soon as they are born ; to them a nursery being an unknown luxury, as we have already noticed to be the case with such classes as moths and butterflies.

There are, however, a few striking exceptions, which stand out in the more vivid contrast from the fact of their being so few and far between. For assuredly no lioness could show a greater solicitude for the welfare of her cubs than does the mother Earwig for her numerous brood, some naturalists even asserting that she sits on her eggs to hatch them ! Be that as it may, she certainly takes the tenderest care of them from the moment they are born, and they follow her about like a brood of young chickens !

There is an old superstition that the earwig used to crawl into the ears of human beings, and thus find its way into the brain, and that it is from this characteristic that the creature derives its name. This idea

may possibly have arisen from the fact that earwigs are notoriously fond of cover, and will always try to creep into any narrow crevice that could be likely to afford them shelter (hence the gardener's device for catching them by placing a flower-pot upside down on the top of a stick, knowing that the earwigs will congregate inside it, where they can easily be caught and killed ; for earwigs do a great deal of harm in the garden by nibbling the petals of the flowers, and any gardener would be glad to see the race completely exterminated); and perhaps, on some occasion, an earwig may have chanced to crawl into the ear of a tramp, or some one asleep on the ground, under the impression that it could find shelter there ; and thus gave rise to what was, at one time, quite a common superstition about them.

But it seems a more plausible explanation, on the face of it, that the earwig derives its name from the exquisite wings with which it is endowed, and which are shaped exactly like a human ear ; so that it is easy to understand that the word should be—and perhaps originally was—ear-WING, the “ n ” having since been dropped out. I have noticed that many people have no idea that earwigs can fly ; but these creatures are very much in evidence on a warm, damp night in summer, and I have even caught them flying around a street lamp. Undoubtedly it is their more usual habit to crawl, but if they see a light in an upper window they will often fly up to it. Moreover, we can quite believe that the little brown form of the earwig would frequently escape detection when on the wing owing to the fact that there are always so many flying things of one sort or another hovering about at dusk ; and indeed I have often found it

necessary to actually catch the creature before it was possible to tell whether it was a fly, a small beetle, or an earwig.

In the accompanying photograph I have endeavoured to portray the beautiful wing of an earwig. With that object I set the specimen with one wing spread out to its full extent, and left the other partially unfolded, in order to show the folds, by means of which the wing is tucked away into the incredibly small compass which gives rise to the delusion that the earwig has no wings at all. However, no form of artificial reproduction can give any idea of the exquisite iridescence and mother-of-pearl reflections with which the gossamer-like fabric is adorned!



Earwig. The right wing is out-spread, to show its ear-like shape; the left remaining only partially unfolded.

The earwig keeps its wings folded tightly away beneath a diminutive sheath, and so compactly that it is quite difficult to find them, unless one knows from experience exactly *where* they are hidden, and in what direction it is possible to open the delicate creases without tearing the frail, transparent structure.

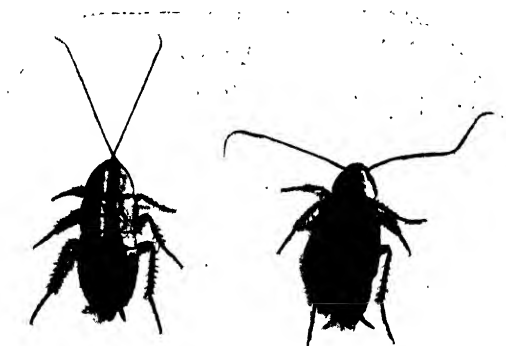
The baby earwig is much paler in colour, and its skin softer and more tender than that of its parent; and, if we lift off a piece of loose bark from an old tree, we shall very probably find a nest of these quaint little creatures, scuttling about like a pack of school-boys just let out to play!

Now we must all have observed the curious pair of tongs with which the latter end of the earwig is

adorned ; and there has been considerable discussion in Natural History circles as to the probable object of these appendages. Some scientists have favoured the idea that the earwig makes use of these instruments for the purpose of folding and unfolding its wings ; but, although I have frequently watched earwigs very attentively when they have flown in at my window, and have seen them alight, I have never succeeded in detecting them in the act of putting their forceps to this strange use. Of course, I may have happened only to fall in with specimens which preferred to keep their pincers for other occasions ! At any rate, it seems highly improbable that the earwig should require anything to help him to *fold* his wings on alighting, considering the fact that they close of their own accord, as if worked by a spring ; and it is owing to this peculiarity that it is a matter of such difficulty to spread out an earwig's wings, as it has to be done *against the spring*, as it were ; whereas the fact that I have actually seen many earwigs alight without any such attempt on their part seems to support the notion that this is not the natural use of the forceps. It is possible that he may use his forceps to help him *unfold* his wings *before* flight ; but I never had the opportunity of watching one take flight, as they would not do so in public,—so cannot offer any evidence on that point.

However, there is one use to which I certainly *have* seen the earwig putting his strange pincers, and on many occasions—*viz.* as a means of scaring his enemies by darting these appendages up in the air on their approach, in order to benefit by the false impression thus given that they are formidable implements. Such an action might well be calculated

to intimidate any lesser beasties than himself. Moreover, I should be sorry to deny the possibility of these implements being even used as weapons, considering the ferocious manner in which they will dig and poke away at the fingers of any one who tries to take hold of one! Many *caterpillars* have this habit of endeavouring to scare away their enemies by striking an imposing attitude, as I pointed out in "Nature's



A pair of Cockroaches.

Riddles," in the case of the Lobster and Hawk-moth caterpillars, and especially the Puss-moth caterpillar with his red danger signals—in view of which incontrovertible facts there is no reason to suppose that the earwig should not "make capital" out of his forceps in a similar manner.

Another creature,—and not a very distant relation of the earwig either,—that may deserve a moment's attention is the common Cockroach (or blackbeetle, as it is often erroneously called, inasmuch as it is

neither black nor is it a beetle!), a pair of set specimens of which appear in the accompanying illustration.

Most of us are only too familiar with this objectionable beast, which is very much on the alert as soon as the lights are turned out for the night in many of our kitchens, where he and his friends hold high revel, until the dawn drives them back into the shelter of their holes. On one memorable night I had the misfortune to place my bare foot upon one of this fraternity, and I am not exactly yearning to repeat the sensational experience!

My reason for bringing the cockroach "before the footlights" is because I have a shrewd suspicion that the mother cockroach does a good deal more in the nursery line than she is commonly given credit for, inasmuch as when I lift up a particular hearthstone in my own kitchen I generally notice beneath it a numerous multitude of very minute cockroaches, and there has always been an old one with them. The whole crowd appear to have a pressing engagement down a neighbouring crack directly they are exposed to the light; but I strongly suspect that the presence of the old specimen was due to the fact that she had a partiality for superintending her own nursery arrangements—at any rate while her babies were still of a tender age.

The cockroaches became a distinct nuisance during one hot summer in the aforesaid kitchen, so it was found necessary to resort to various expedients for getting rid of them. The brown-coated gentry treated with the supremest contempt an "infallible" beetle-trap which an enthusiastic ironmonger supplied for their delectation; in fact, this object seemed to

greatly increase their numbers, as they apparently looked upon it as a sort of new game especially introduced for their benefit, in order to alleviate the dull monotony of their treacle-bibbing, jam-stealing, crumb-snatching existence. A welcome diversion, forsooth; for I don't suppose that cockroaches can play Bridge! Accordingly, I introduced a hedgehog one



A novel occupant.

night, after keeping him without food for several hours in order to whet his appetite.

How many of the cockroaches the prickly gentleman actually accounted for will never transpire; but he evidently had an eye to his own comfort, and could not resist the temptation to take advantage of the warm kettle which he found upon the hearth, in which snug retreat he was discovered by the cook next morning, when she went to prepare an early

cup of tea ; and her disgust was not lessened when she found she could not get the intruder out again !

The accompanying illustration shows the hedgehog in this unique position, the photograph having also appeared in the Christmas number of the *Strand Magazine* for 1903.

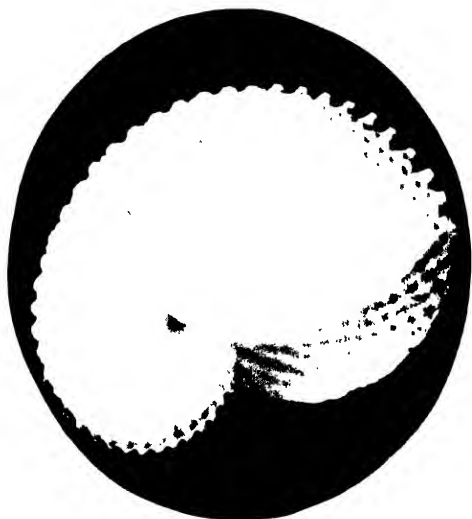
It was indeed a "kettle of fish," inasmuch as the beast obstinately refused to unroll himself ; and as long as he kept in a rotund attitude, he was too large to be pushed or squeezed through the aperture with any degree of comfort either to himself or to my fingers. At length, however, by dint of many pulls and shakes, the extrication was accomplished, though not until the sharp spines had left more than one impression on my hands !

There were certainly not the usual swarms of cockroaches visible when I went into the kitchen that night, so I assumed that the gentleman had done his duty.

Talking of cockroaches, I have come across an amusing experience of Sir Richard and Lady Burton in this connection during their travels on the Continent, which I will take the liberty of quoting :

"After two days," writes Lady Burton, "we were given a very pleasant suite of rooms—bedroom, dining-, and drawing-room, with wide windows overlooking the Tagus and part of Lisbon. These quarters were, however, not without drawbacks, for here occurred an incident which gave me a foretaste of the sort of thing I was to expect in Brazil. Our bedroom was a large whitewashed place ; there were three holes in the wall—one at the bedside bristling with horns, and these were cockroaches some three inches long. The drawing-room was gorgeous with yellow satin, and

the magnificent yellow curtains were sprinkled with these crawling things. The consequence was that I used to stand on a chair and scream. This annoyed Richard very much. 'A nice sort of traveller and companion *you* are going to make,' he said; 'I suppose you think you look very pretty and interesting standing on that chair and howling at those



• The Nautilus, who uses her shell as a nursery for her babies.

innocent creatures.' This hurt me so much that, without descending from the chair, I stopped screaming, and made a meditation like St. Simon Stylites on his pillar; and it was, 'That if I was going to live in a country always in contact with these and worse things, though I had a perfect horror of anything black and crawling, it would never do to go on like that.' So I got down, fetched a basin of water and

a slipper, and in two hours by the watch I had knocked ninety-seven of them into it. It cured me. From that day I had no more fear of vermin and reptiles, which is just as well in a country where Nature is over-luxuriant. A little while after we changed our rooms we were succeeded by Lord and Lady Lytton, and, to my infinite delight, I heard the same screams coming from the same room a little while after. 'There,' I said in triumph, 'you see I am not the *only* woman who does not like cockroaches.'"

So much for the cockroach.

There is another very faithful nurse to be found in Nature's establishment who is well worthy of our attention. One of her kind is at the present moment comfortably ensconced in the corner of my dressing-room ceiling, where I am prepared to swear that she has been for some months, in spite of the opinion which the housemaid might hold on the subject. However, there she is—the Spider, not the housemaid—and there she will probably remain until she joins the majority; for she gets a royal lot of flies—in fact, she has the monopoly of the room; and, judging by the peculiarity of the shape thereof, I should imagine that she has taken out her letters patent for the particular kind of web she has constructed in the corner. I have not yet attempted a perilous climb in order to discover whether there are as yet any inmates of her nursery; but if the lady has not hitherto actually entered upon family life, I have no doubt that her busy head is full of pleasant anticipations of the happiness to come.

Spiders are certainly most devoted mothers; and many of us have noticed a large and beautiful species

which usually frequents commons and heaths, loving to scramble about among the heather and gorse, in spite of the fact that she carries with her the whole time an enormous white bag of eggs, which she hugs tightly and jealously to her maternal bosom. This bundle is frequently larger than her own body, and must be a fairly cumbersome burden ; but nothing will induce her to leave go of it, she preferring to die rather than part



Three Limpets on a rock. The protective resemblance of these shell-fish to their surroundings is very striking.

with her precious offspring. Even if one succeeds in dragging her away from it without injuring her, time after time will she endeavour to snatch it up again and scamper off ; and if one is not very sharp she will succeed, for she is a nimble body, and the consciousness of danger to her beloved infants will give fresh stimulus to her efforts on their behalf.

But in spite of this motherly devotion, the absurd

part of it is that the spider does not appear to recognise her own bag of eggs apart from any one else's, and she will be equally content if her bundle be taken away and another lot substituted. Fancy, dear reader, if your baby's perambulator came in one fine morning with some one else's child ensconced inside, and the nurse blissfully unconscious of the fact!

(This supposition reminds me of an incident on the parade at Eastbourne that puzzled me considerably when I was staying there recently. Every morning I used to meet a nurse wheeling a large double perambulator, which was generally *empty*; she spent the greater part of the morning in strolling to and fro from end to end of the parade, gazing abstractedly around her, as though it were quite a minor consideration whether the vehicle were occupied or not, and thus she would often pass me some dozen or more times during the course of an hour or two.

But the mysterious part of the proceedings was that occasionally, when she repassed the spot where I was sitting, there *was* a baby in the pram, and once there were two! Then, perhaps, the next time she passed, the occupant would have disappeared again, although only a few minutes had elapsed. I never obtained any satisfactory solution of the conundrum, as I could not exactly follow them up and down to see; but some one suggested to me the rather preposterous explanation that the nurse and pram might have been "on hire," like a cab or bath-chair.)

Nurse Spider's peculiarity in this respect is perhaps accounted for by the fact that she is extremely short-sighted, and apparently cannot see farther than her own feet. Lord Avebury mentions some experiments which he made in this connection in his interesting



Five Shell-fish, which bear a strong resemblance to the bladders on the Seaweed.

work "The Senses of Animals," from which I will quote his own words:

"Plateau has made some interesting observations, from which it appears that spiders are very short-sighted, and have little power of appreciating form. He found they were easily deceived by artificial flies of most inartistic construction, and he concludes that even hunting spiders do not perceive their prey at a greater distance than ten centimetres (about four inches), and in most cases even less. Scorpions appear scarcely to see beyond their own pincers.

"I have also made some experiments on this point with spiders (*Lycosa saccata*). In this species, which is very common, the female, after laying her eggs, collects them into a ball, which she surrounds with a silken envelope and carries about with her. I captured a female, and, after taking the bag of eggs from her, put her on a table. She ran about for a while looking for her eggs. When she became still I placed the bag of eggs gently about two inches in front of her. She evidently did not see it. I pushed it gradually towards her, but she took no notice till it nearly touched her, when she eagerly seized it.

"I then took it away a second time and put it in the middle of the table, which was two feet four inches by one foot four, and had nothing else on it. The spider wandered about, and sometimes passed close to the bag of eggs, but took no notice of it. She wandered about for an hour and fifty minutes before she found it, apparently quite by accident. I then took it away again, and put it down as before, when she wandered about for an hour without finding it.

"The same experiment was tried with other individuals, and with the same results. It certainly

appeared as if they could not see more than half an inch before them, in fact, scarcely further than the tips of their feet.

"I may also mention that they did not appear to recognise their own bags of eggs, but were equally happy if they were interchanged. On the other hand, it must be remembered that the sac is spun from the spinnerets, and the *Lycosa* had perhaps never seen the bag of eggs. Hunting spiders certainly appear to see their prey at a distance of at least several inches."

I have introduced also in this chapter some rather interesting illustrations of shellfish subjects, the nursery of the exquisite *Nautilus* appearing on page 265, which is remarkable from the fact that the female alone has a shell, which she uses as a nursery to keep her young ones in ; three tiny limpets on a large stone, singularly like themselves in coloration, which I found amongst the rocks at Eastbourne, figured on page 267 ; and some small shellfish, common enough on our sea-shores, and very interesting, owing to the striking resemblance which they bear to the little "blobs" on the seaweed, to which they love to cling, and in which position they are seen on page 269.

CHAPTER II

WASPS, SCOUTS, AND OTHER THINGS

THERE are some first-class nurses to be found among the members of the Bee and Wasp tribes; for, although it is not their habit to convert themselves into living perambulators for the benefit of their young olive-branches (as is the case with Nurse Spider), yet they provide for their comfort in other ways; sometimes, indeed, in a manner which shows an astonishing amount of foresight and consideration for the future needs of their offspring!

There is a species of solitary bee which constructs an underground house for her baby, with larder complete, in order that it may be snug and comfortable during its short life in the grub state. She lays her egg in this retreat; and then, after having stocked the larder with as much honey as the little one could possibly require, she shuts the door and fastens it securely, so that no intruder can get in to interfere with the comfort of her little charge, or purloin the supply of food that she has so carefully stored up for its provision.

But there is a species of wasp that even "goes one better," as our American friends would put it; for she knows full well that her young hopefuls would eschew entirely any form of vegetarian diet, and will possess carnivorous tastes; and that, therefore,

suitable food must be provided for the grub as soon as it comes out of the egg. Now this is not the simple matter that it is in the case of Nurse Bee; for, whereas the latter's supply of honey or such provision will keep good for practically any length of time—and certainly very much longer than her infant would require—it would, on the other hand, be manifestly ridiculous for the wasp to fill her larder with a motley array of beetles, spiders, or caterpillars, whose little bodies would “go bad” (as the children say) very quickly, and the grubs would find nothing but a mass of insect carrion on their advent into the world, which—although it would be quite in accordance with the tastes of some of their distant relations—would not be at all agreeable to that of the embryo wasps.

Moreover, the fond nurse has other things to do besides waiting about until her young charge comes out of the egg, and then setting to work to bring it provisions as it may require them; nor is there any refrigerator in her storeroom, or the difficulty would be easily overcome, and the youngster would find a capital meal of frozen beetle or prime chilled caterpillar awaiting him.

Here, indeed, is a “poser”! But the lady is equal to the occasion, and devises forthwith an ingenious plan for providing her storeroom with a supply of meat, which, although not actually “refrigerated,” is prepared in a manner which is precisely the same for all practical purposes!

Accordingly, she proceeds to make a collection of toothsome spiders, caterpillars, or such small fry—whatever she thinks the “young idea” will most fancy—and she then inflicts upon each individual a sharp sting in the very centre of its nervous system,

thereby depriving the unfortunate creature of motion, though not of life. Thus they are paralysed, and can do nothing but lie motionless, awaiting the highly interesting moment when the gentleman will come out of his egg and devour them!

Such an artifice as this would be fairly hard to beat!

Talking of wasps reminds me of a very funny experience which I had with a common wasp, when I was an undergraduate at Oxford.

One day, while at lunch in my college rooms with a friend, the well-known monotonous buzzing sound suddenly announced the arrival of one of these miniature tigers of the insect world, which had come in through the open window, and was proceeding to explore the unknown country. Probably he was attracted, in the first instance, by the redolent effluvium of plum-tart floating on the air, which could hardly have escaped his susceptible "nostrils," for he very soon came to anchor in my friend's plate; and, without waiting for an introduction, proceeded to help himself liberally to the crimson juice.

As this man happened to belong to the large community who entertain an extreme horror of wasps, he made no attempt to secure or remove the unwelcome visitor; but chose what is undoubtedly the only sensible course to adopt in the event of being threatened with immediate danger at the hands of either a wasp or a bicycle, and accordingly kept perfectly still, gazing solemnly the while at his plate of unfinished tart.

When I had sufficiently recovered from my amusement at the sight of his woe-begone countenance, I picked up a glass and endeavoured to place it over the thief, and thus effect his imprisonment; but at

the same moment, he became suspicious and made a dash for liberty, with the result that the rim of the glass came down with a sinister crash upon his slender "waist," severing him in half at that juncture!

The insect seemed much taken aback at this unexpected misfortune; and, discovering that it was more or less impossible to preserve his equilibrium without the aid of the useful ballast afforded by the body now reposing beneath the glass, the front half of him continued to buzz round and round on the table in a most anxious state of mind—just as a kitten does when trying to catch its own tail! At length he became somewhat more composed, and stood still to rub one of his feelers with his front leg—this being a wasp's method of twirling his moustache! I took him up, thereupon, and deposited him in my own plate, where there was, by this time, nothing left save a few streaks of juice, which are usually the only remnant of an encounter between a healthy appetite and a normal "college helping" of plum-tart!

Without a moment's hesitation, and apparently quite oblivious of the enforced absence of his "better-half," the wasp plunged his head into a drop of the fragrant juice, and began "guzzling away for all he was worth," as my friend disgustedly remarked!

The rapacity of that creature was well-nigh incredible, aided by the fact that he could suck away to his heart's content, without any fear of indigestion; for, as fast as he ate it, the liquid came out in a bright crimson bead, at the point where his body should have been! He made short work of the drop of juice he had been negotiating, whereupon I turned him round, and he at once attacked and finished the same drop all over again; and

I only regret that I cannot state the exact number of times that this weird process was repeated, owing to the fact that I have lost the pocket-book in which I made a note of the incident at the time.

The wasp certainly accounted for the same drop *five* times over at least, as my friend,—who was sitting in an arm-chair smoking a cigarette,—held up a finger for each time ; but when he had finished one hand, he could stand it no longer, and hurriedly left the room. However, I kept on with the novel entertainment until I was obliged to go out ; and then the interesting relic—not being adapted, by its condition, for the serious business of life—was finally demolished with a spoon.

My servant came in to clear away the lunch before the exhibition was ended ; and, being a tender-hearted man, appeared much horror-struck at the sight, murmuring with ill-placed sympathy, “Pore little thing ; how crool !” and being also rather thick-headed, nothing could induce him to believe that I was anything but a most unfeeling wretch to allow the wasp to “linger on,” although I drew his attention to the evident gusto with which the “pore little thing” was regaling himself !

Now I appeal to my intelligent readers : Could that wasp have possibly experienced any sensation of *pain*, or even discomfort, during the half-hour or so that it spent over the consumption of plum-juice, if it could be so entirely wrapped up in its occupation ?

Surely this instance shows very clearly that the lowest forms of animal life can have no conception of the feeling of actual pain, in the sense that *we* understand the term ? Quite possibly the wasp felt considerable annoyance, and perhaps a small degree of discomfort, when it was deprived summarily of its

body, and a good deal of perplexity afterwards, when it discovered that it could in no wise maintain its equilibrium in its customary manner; but how infinitely small the degree of that sensation must have been is very definitely proved by the manner in which the insect became totally oblivious of its recent experience, as soon as it was confronted with the chance of a pleasant meal! It is my sincere belief that the Creator has purposely arranged that the lowest forms of animals—which would naturally be most frequently destroyed or maimed—should experience practically no suffering during the process, by omitting from their composition the power of feeling any real sense of pain; and I could name more than one eminent scientist who shares this opinion; otherwise it would be appalling to contemplate the infinite misery that would be caused every time a gardener digs in the ground, when each thrust of the spade must cut a worm or two in half!

The worm will writhe and wriggle away, but it is no great length of time ere each of the pieces has grown a new head or tail, and thus two new complete worms are the result of the accident.

This reminds one of the story of the little boy, who, having been taken to task by his aunt for cutting a worm in two, indignantly replied that he did it entirely from kindness, because he thought the poor thing looked so very lonely!

The accompanying illustration shows a worm which had been practically severed by a spade when I found it; but we can see that the wound has completely closed up again, and the worm is apparently none the worse.

A worm possesses a complicated nervous system, and even a caterpillar has several thousand muscles; and, therefore, were the sense of pain possible to these

lesser beasties, how terrible would be the sufferings of myriads of creatures constantly going on around us!

Do not let any of my schoolboy readers imagine that this view of the matter allows them a free license to wantonly destroy or mutilate insects because they are incapable of the sense of pain! It is just as wrong to unnecessarily damage the exquisite work-



A Worm, none the worse for having been nearly cut in half.

manship of a living creature, as it would be to deliberately break off a piece from a valuable vase in his mother's drawing-room--with this difference, that whereas the vase can often be mended, no power on earth can restore the life to a broken insect! So that, although such an action could not correctly be described as "cruel"—a term which necessarily implies the infliction of *pain*—yet it is none the more justifiable.

This condemnation does not, of course, apply to

the formation of a collection of butterflies or such insects—whose pretty colours and exquisite construction are in themselves an education—provided they are not ruthlessly slaughtered for the sake of quantity. A cabinet of insects, carefully set and nicely arranged, will provide an infinite amount of entertainment and instruction for a winter evening or a wet day, when one cannot to the same extent get out and study the habits of the creatures in their own natural surroundings.

Even the higher animals cannot be supposed to suffer anything like the *same extent* of pain as human beings, although the feeling, in their case, is essentially similar; and mutilation of a tiny wee Shrew Mouse would be sheer *cruelty*, although it would be nothing of the sort in the case of a huge Death's Head moth nearly twice its size.

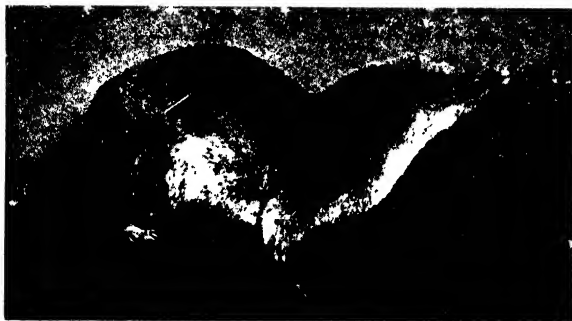
I reproduce here, side by side, the photographs of a stuffed Shrew Mouse and a Death's Head, in which we see that the *insect* is *actually* considerably larger than the *animal*!

A horse would undoubtedly suffer intense pain if it broke its leg, but the sensation would not be nearly so acute as it would be in the case of a man. "How do you know?" I hear some one exclaim. "You have never been a horse, so how can you tell how much they feel?" My answer is that I have seen a horse that had broken its leg in a fence, standing with the broken limb hanging useless at its side, *quietly eating grass*! Would the animal's *master*, in a similar condition, be feeling much inclination to regale himself with a ham sandwich? It is true that we cannot enter into the precise extent of the horse's feeling, but we can form a *comparative* notion, if we watch the subsequent actions of the animal.

A half-grown chicken of mine was foolish enough to stray into the sacred precincts inhabited by a hen with a brood of tiny chickens, and in consequence the rash intruder received the most sanguinary punish-



Death's Head Hawk-Moth. The insect is even larger than the animal.



Stuffed Shrew Mouse.

ment, the infuriated mother plucking every feather from its head and neck, and inflicting such a horrible wound that the whole skull was laid bare! The unfortunate chicken was rescued in an almost dying condition, brandy and bandages were administered at

intervals by sympathetic beings, and a very few hours afterwards the wounded bird was walking about with its head swathed in rags, and richly anointed with vinolia cream, and oil enough to excite the envy of any crowned head in Europe; and, although it appeared distinctly ill at ease, it was not prevented from eating,—and evidently enjoying,—a hearty meal of corn!

The dying soldier carried from the battle-field in a similar critical condition, --if not actually unconscious,—suffers such furious agony that it is many days before the sensation thereof ceases to quash every other impulse, and still longer before it would permit him to cherish any inclination to sit down to his customary plate of roast beef!

This chicken, moreover, entirely recovered before long, although she has never had any feathers on her head since, for

which reason she was christened "Broken-head"; and she grew up to be a well-favoured pullet, as the accompanying illustration testifies. Whether the drastic treatment she received as a child so impressed upon her mind the precarious nature of a chicken's life, that she decided to make the most of her allotted span, I cannot say; but, anyhow, her subsequent record would lead one to think so, for she laid her first egg before she was six months old, and within ten months of that day she presented me with no less than 228 eggs, and hatched a brood of chickens into



"Broken-head."

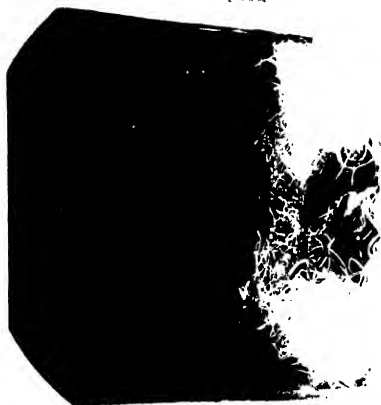
the bargain ! There was no doubt about these figures, because the condition of the hen's head rendered it impossible to mistake her for any of the others, and she happened to always choose a spot in which to lay her eggs that was never used by the rest, being for some reason or other unpopular. It was subsequently suggested to me that I should subject some other chickens to the same treatment, to see if the result were equally satisfactory ; but, needless to say, I declined to make such an experiment.

Ere we again take up our parable—from which I must confess to having somewhat strayed—I must include some illustrations of a foster-sister of this remarkable hen, which was no less peculiar in her own way.

The eccentricity of this bird—whose plumage was as black as her sister's was white—will be apparent when we remember that the domestic hen, being naturally a ground bird in a state of nature, makes no attempt at lining her nest in any way, but lays her eggs in a hollow which she has scooped in the earth. But this particular hen evidently determined to set aside the traditions of her ancestors, inasmuch as she soon evinced a marked dissatisfaction with the comfortable nest which I had prepared for her when she was ready to sit. She was apparently of an artistic turn of mind, and opined that it was just as necessary to prepare some form of ornamentation for the good of her mind, as a snug bed for the comfort of her body. Accordingly, she managed to pull out some bunches of fine shavings (such as are used for packing china when sent by post) which I had stuffed into a far corner of the coop to keep out the draught, and then picked them to pieces and arranged them as a kind of hedge around herself and her eggs in such



A glimpse of her eggs, and the hedge she
has made round them.



The artistic hen on her nest.

a manner that she was well-nigh hidden from view behind this unique barrier.

Every morning, when I turned her off to feed, I flattened the shavings down again, lest she should get any of the eggs lost in them; but the moment she had settled down upon her nest each time she proceeded to rearrange her hedge according to her own



The artistic hen off the stage.

satisfaction. I frequently watched her during the occupation, peeping through the crack, so that she could not see me; and it was very curious to notice the evident pleasure that she took in her work. Moreover, it was vain to attempt to stop up the crack, into which I had first stuffed the shavings, with a fresh supply, because each additional lump was promptly pulled out and added to the pile around her.

In the accompanying illustration of the hen on her nest I have flattened down the hedge in front of her, or she would have been quite hidden from view ; but the other photograph of the nest, taken while the bird was off feeding, gives a fairly adequate idea of the eccentricity and dexterity of this artistic bird.

Furthermore, besides the instance of the "broken-headed" hen, if we like to look out for similar examples, we shall find that, the lower the creature in the scale of animal life, the smaller is its capacity for realising the sense of pain, until the emotion is minimised or practically lost in the many forms of insect life. And therefore I think we shall not be far wrong in concluding that, although we cannot gauge to a nicety precisely what our friend the wasp felt on this occasion, his enjoyment of the plum-juice was in no way marred by the peculiar circumstances under which he found himself !

However, I vainly endeavoured to expound a condensed version of these tenets to my unwilling attendant,—“scout,” as the college servants are called at Oxford,—and his incredulity was so apparent that I at length desisted, as I could see that he thought I was trying to “have him on” ; and, as I had already had more than one joke at his expense in times past, it behoved him to be cautious. Now, although the fraternity in question may not be of the same opinion, there is no doubt that practical jokes are very useful when judiciously applied to the common or garden scout. In the days when I went to college one of the first things that a young fellow had to settle was whether he or the scout was to be the master (morally speaking) ; neither was there any peace of mind for either of them as long as this point was disputed ;

and my own experience was that nothing could so effectually impress upon the mind of one of these petty tyrants that *he* was not going to wield the sceptre, as the careful application of a salutary practical joke; and, if the selection were judiciously made, a repetition was seldom necessary to complete the conquest.

But, once the scout was permitted to get the upper hand, it was a difficult matter to bring him to his place, and usually the unfortunate undergraduate was thenceforth entirely under the thumb of the domineering factotum;—for it is a delicate matter to have to prove to one's scout that *he* alone is responsible for the rapidity with which one's provisions disappear; and again, it is so easy for him to give the excuse that he “was attending to another gentleman, sir,” if he does not wish to come when one calls him! By way of variety, he can, with equal show of reason, pretend that he did not hear the call, although one may have been making the ancient staircase ring for some twenty minutes with the crude syllables composing his name; not to mention the countless other petty matters in which he can exercise his tyranny unchecked, for he is far too wily to give one anything tangible from which one could construe a subject for complaint, inasmuch as he is *outwardly* always the same obsequious servant, full of profuse apologies for not having heard one, albeit he may have been employed the whole time in washing up and breaking one's cups and saucers a few feet from the door!

A friend of mine, who was studying for the medical school, suffered considerably the first term after he had moved into some new rooms on a staircase which groaned under the jurisdiction of a veritable autocrat.

The student in question was naturally of a fairly easy-going disposition, and the result was that his life became a burden. His breakfast was never brought until the scout had nothing else particular to do ; the handles came off his cups automatically ; and the climax was reached when he returned to college at the end of the Vacation, and discovered that two *unopened* bottles of brandy, that he had left in his sideboard, had disappeared ! He had grown quite used to his bottles vanishing mysteriously as soon as the liquid had got down to the level of the top of the " thumb-hole " ; but unopened bottles was a bit too strong ! So he inquired for them, and received the bland reply, " Very sorry, sir ; and I can't think how it came about, sir ; but they went that bad, sir, that I had to pour 'em down the sink, sir ! "

This was the last straw ! There is a point where even the worm will turn. Had the blood-sucking autocrat been wise in his generation, he would have played his cards more carefully, keeping such an ace of trumps as two unopened brandy-bottles until his master was about to leave for ever ; and then his despotic rule might have continued during the natural term of the lenient student's undergraduate existence. But, as is so frequently the case, one false step had spoiled the game, and his good-natured master determined upon immediate action, and therefore proceeded to lay his plans carefully.

It so happened that he had arranged to go home for two or three days at the end of that week, in order to be present at some family festival ; and accordingly he waited patiently, without making any further allusion to the vanished bottles, until the day arrived ; and then, having informed his scout what

day to expect him back, he "sporting his oak"—(locked his outer door; every room being provided with a heavy oaken outer door, of which the scout has a duplicate key)—late in the afternoon, and took his departure for the station.

No sooner had his master's hansom started off up the High Street, at the clattering gallop peculiar to the Oxford type, than the scout marched in to the forsaken apartments to see what "perks" he could lawfully—or unlawfully—appropriate.

But, on this occasion at any rate, the gentleman found more than he bargained for; and the rapidity of his retreat caused the old building to shake with the force of the slamming door as he "made tracks" down the stairs, as fast as his wicked old legs could carry him, nearly colliding, in his headlong flight, with the undergraduate who shared the small landing with the medical student, and who was just sauntering up the stairs to his room, on his return from football.

At a loss to account for the spectacle of the usually sedate scout hurtling through space in such an unaccustomed and unacademical manner, the undergraduate stood for a moment aghast, gazing after the fleeting form; and then decided to enter his friend's room by means of the key which was still in the door, in order to ascertain the cause of the phenomenon.

He marvelled no longer at the hasty exit of the would-be plunderer; for the first thing that must have encountered the horrified eyes of the altogether unsuspecting scout, as he entered the room, was the sight of an enormous human skeleton seated on the edge of the table, with one gaunt arm pointing grimly in the direction of a row of bottles arranged upon the sideboard; while, from the staring eye-sockets issued

a faint phosphorescent glow ; and the ghastly grin of the widely opened jaws was accentuated by the presence of a skilful arrangement of phosphorus within—the whole producing, in the dim fire-light, combined with the deepening twilight, an effect that must have been truly awful !

The cure was complete !

When Mr. —— returned to his rooms, after an absence of three or four days, there was no sign of his scout ; nor did he call that worthy until he had been into his room ; when he chuckled as he noticed the dust lying thick upon his mantelpiece, and everything just as he had left it. Replacing the grim sentinel in its long box under the window-seat, where it had formerly been kept securely locked, he went out into the town for a few minutes to get something he wanted, leaving his door open, as a hint to the scout, whom he felt sure was not far off.

When he came in again he found his room swept and garnished, and the table laid for lunch ; moreover, he had hardly opened his mouth to call the scout, before that gentleman came running ! From that day forward, no man in the college was better served, or had less reason for complaint, than the owner of that gruesome sentinel !

There was a mutual understanding between master and servant, which lasted as long as the pair remained associated ; and, although the subject was never once broached between them, nevertheless when the scout felt an extra large tip pressed into the palm of his hand at the end of the term, he knew that it was meant, not so much as an acknowledgment of his excellent services, as an unspoken reminder to beware lest a worse fate befell him !

When I was entertained with a graphic description of the episode afterwards, I was quite willing to agree with my medical friend's somewhat forcible comment that "the old beggar must have had a most unholy fright!"

My own scout was reduced to submission before he had had a chance to assert himself,—if a mild Irishism be permissible,—before, indeed, he had even an opportunity of discovering "what sort of a gent" was the new tenant of his first floor. The conquest was effected quite unconsciously, as far as I was concerned, albeit it was none the less permanent; for, being ignorant of the scoutish character and the pretty little ways of that class of creature, I was naturally unaware of any necessity for subjugating the fawning individual to whom a paternal college had entrusted the duty of ministering to my welfare, and it was brought about entirely through a partiality which I evinced in those days for an occasional innocent practical joke.

The first day after my advent within the classic walls was spent in settling into my rooms, during which process my scout appeared to be the personification of obsequious attention; indeed, the obliging manner which is usually affected by the species, and more especially at the outset of his young master's career, gives no foundation for the faintest suspicion that he could have any object in life other than the fulfilment of his master's uttermost behest, thus serving the more effectually as a cloak for the many delinquencies with which the character of the average specimen unfortunately teems.

My kindly assistant afforded me a helping hand, both by action and suggestion, but particularly in the

matter of the compilation of a long list of necessary (and wholly unnecessary) groceries and other stores, which he undertook to order from the kitchen in my name, and in the formation of which he evinced the liveliest interest,—as was indeed natural, considering that it was a matter which would closely affect himself and his devoted family at home.

The same evening I mentioned that I was expecting a friend to breakfast on the following morning, whereupon the scoutish physiognomy beamed with satisfaction at the pleasant prospect of dainty fragments which could be subsequently transferred to the useful and capacious basket which the typical specimen always keeps for the reception of the numerous “perks” which fall from his master’s table,—which “falling” process receives no little assistance by the efforts of the two-legged parasite, -and with which he marches off triumphantly under cover of darkness when he goes home at night, walking with a light and airy step in order to dispel the illusion that the basket is at all heavy, should he encounter a too suspicious eye on his way out through the quadrangle.

Oh, how often have I longed for a short peep under the lid of one of those famous baskets!

Accordingly, when the worthy individual came in next morning to call me, and receive my orders for breakfast, he made no pretence at concealing his surprise at the simple request for “coffee, toast, and a sausage, please!”—an order which was not at all in accordance with the usual lavish traditions of Oxford breakfasts; and he proceeded to remind me that I had told him the night before that I was “expecting a gentleman to breakfast.”

“Oh, yes,” I replied, “ask the cook to send up a

little scrap of raw meat on a plate, please ; that's all he will want." Then, as the man's eyes grew larger and rounder every moment, "There he is!" I concluded, pointing to a healthy young alligator, which was at that moment vainly endeavouring to scramble into the bath, having been roused from his corner by the light streaming in at the window as soon as the blind was drawn up, the while vehemently opening and shutting its capacious jaws with a significant click ; and, although it was but a youngster and only two or three feet long, its appearance was quite formidable enough to make some impression upon a timorous beholder !

A hasty exit was the immediate result of the introduction ; and although I afterwards endeavoured to assuage the man's alarm by assuring him that the beast would not hurt him, provided he did not interfere with it,—in fact, they are entirely harmless at this age, though I did not think it advisable to let the man know too much,—I noticed in future that he never omitted to glance furtively round on entering the room, and from time to time he would inquire, with a very transparent pretence at jocularity, when the "gentleman" would be old enough to "go for" his legs !

Whether the constant apprehension of my springing upon him some other unpleasant surprise at any time actuated him to mind his ways, I cannot say ; but anyhow that scout was my most devoted slave during the year that I spent in those rooms, which was a very different character to that which some of his other masters gave of him ; and he took the profoundest interest in my caterpillars (especially when one was inadvertently allowed to escape and discovered career-
ing

wildly round his pantry), even bringing in the most impossible leaves, which he humbly proffered for the delectation of "them grubs," although he showed considerable disquietude at some of the "pets" which I produced for his admiration at various times.

When I moved into larger rooms at the end of my first year, I encountered a scout who required no subjugation, being a very superior person. This was perhaps just as well, seeing that he was a strong-minded man, and would in all probability have greeted the most sudden or alarming surprises with a smile of equanimity, for he regarded quite placidly a beautiful snake which I suddenly brought out of my pocket for his delectation ; so that I saw at once that any efforts in this direction would undoubtedly meet with failure.

This man was the nearest approach to perfection that I have ever met with in a scout, for he at all times showed a real anxiety, as well as a singular capacity, to give complete satisfaction in every detail ; and my parting handshake, at the end of two years, was eloquent of very genuine regret at the reflection that his kindly *régime* was terminated.

My readers may have opined, from my remarks on scouts in general, that I entertain but a poor opinion of the species. They are quite right in their surmise. Moreover, any old Oxonian will bear me out that whereas one occasionally comes across an individual who, like Cæsar's wife, is above suspicion,—standing like an oasis in the desert of college parasites,—what I have said does no injustice to the majority of beings included in the genus "scout."



Five Moths at rest amongst dead leaves.

CHAPTER III

ANTS AND PATRIARCHS

SOME of the most wonderfully organised nurseries to be found amongst the animal creation are those of the industrious Ant.

So much has been written about the ant, and so many interesting experiments have been made by various scientists in connection with these fascinating creatures, that there can be but very little left to be discovered. Their nurseries are extensive and exquisitely regulated, with an accomplished staff of nurses to attend to the infants and supply their every want ; and a certain species of fighting ant even goes so far as to enslave the members of a weaker tribe, in order that they may act in the capacity of nurses to their babies !

Moreover, the parents belonging to this tyrannical race will refuse point-blank to do any nursing on their own account, but leave the whole business entirely to their slaves; and, in fact, they are sometimes so abominably lazy as to decline even to *feed* themselves, and the unfortunate menials have actually to put the food into their masters' mouths!

Lord Avebury tells us that members of this species would prefer to die of starvation rather than take the trouble to procure their own food, and that if their slaves were to be taken from them this is what would undoubtedly happen—the truth of which he has himself proved by repeated experiments.

He further mentions, with regard to some of these pampered individuals, which he kept in captivity in order to have a better opportunity of studying their habits, that he found that it was usually sufficient to provide them with a valet for an hour or two every day, to give them a wash and brush-up, and serve their breakfast—and I suppose to shave the gentlemen and curl the ladies' hair, although the chronicler does not mention these latter items! However, his specimens under observation seemed to get along all right if they were allowed this luxury, and he says that "under these circumstances they remained in perfect health, while but for the slaves they would have perished in two or three days."

There is another kind of ant, whose energetic nature appears in striking contrast to that of these apathetic gentlemen of fashion; for they are not content with personally performing all their ordinary duties, but must needs also practise baby-farming on quite an extensive scale: and not only do they attend to the wants of their own children, but they take in

other people's babies to share their nursery! Moreover, the adopted infants are not even the progeny of ants, but of a totally different race of beings; yet these aliens are tended with the same anxious solicitude by the careful nurses, and afforded the same degree of untiring attention, as if they were the legitimate sons of the house!

However, we shall see, on investigation, that there is "method in their madness," and that these curious nurses are indeed wise in their generation; for it is solely because the baby strangers will prove to be of the utmost service to the ants in days to come that they take such care of them in their infancy.

Some of my readers may have read the interesting series of articles by the late Grant Allen which appeared in the *Strand Magazine* some years ago under the title "In Nature's Workshop," in one of which he described many of the doings and customs of ants at home and abroad; and he further showed, by means of illustrations from drawings, how some ants even go to the extent of keeping a herd of cows to supply them with milk—these "cows" being nothing more or less than the "green fly," or Aphides, which infest the rosebuds in our gardens, and which emit a sort of delicious fluid like honey, greatly relished by the ants, who therefore keep flocks of them, and regularly drive them backwards and forwards to pasture!

Now there is a species of these cows which feeds upon the roots of certain plants, and this is the breed which is patronised by the enterprising ants. In order to make assurance doubly sure, the wily ants even go so far as to make provision for a large herd of cows the following season by resorting to the

expedient of collecting the eggs of these creatures, and keeping them snug and warm in their own nursery all through the cold winter months.

When the voice of Spring begins to call the buds to life and clothe the trees with green, the thoughtful nurses gather up the eggs again, and carry them out to be replaced upon the plant.

Although we have most of us heard the old story of the indignant but absent-minded dairyman, who informed a questioning customer that the eggs he supplied were "fresh from the cow this morning, sir," it seems funny to think that there should be any kind of cow which really does come from an egg of sorts!

Now, besides being the proud possessors of a flourishing dairy-farm, Lord Avebury also tells us that certain kinds of ants actually keep tame cats and dogs—or what answer to the same purpose—in the form of small insects, which live in their nests with them, and which can be of no possible use to the ants, except in the character of pets; for the ants take no notice of them whatever, and the little creatures run in and out of their masters' legs, playing around just as kittens would, and even jumping on the backs of the ants, as if to get a ride!

Ants are most instructive creatures to keep in captivity. I have put together an imitation nest between two large sheets of glass, so that I can satisfactorily observe the habits of the colony established therein; while a moat all round effectually keeps them within bounds.

It is curious to see how many people seem to entertain a downright horror of ants; although, if treated with proper respect, they are really most fascinating creatures. It is true that, if one should happen to sit

upon them suddenly, one would run the risk of some small but painful bites ; but surely in this case even their bitterest foes would admit that the ants would have some excuse for their behaviour !

The same applies to wasps, and indeed to most other insects --excepting, of course, such species as gnats and mosquitoes, which bite in order to get food. And indeed it is very exceptional that a wasp will deliberately sting any one, provided that he is not hurt, annoyed, or frightened in any way ; that is to say, if he receives no provocation first. If he should happen to crawl up one's sleeve, he is pretty sure to sting, because he is a timid creature ; and when he feels the pressure of the sleeve, and moreover cannot find his way out again, he loses his head, and stings away for all he is worth ! Wasps are, however, very intelligent, and can, with trouble and patience, be educated up to a condition that might almost be called tame. I knew an old gentleman who would let them crawl at will over his hands and face, and he was never stung by them. They would even let him touch them, and I am sure that they could distinguish the hands of their kind patron from those of any one else.

Animals seem to have a wonderful instinct which draws them magnetically to people who love them, and is it too much to suppose that *insects* might share it in a lesser degree ?

Few of us, however, are accustomed to indulge in expressions of delight if we are suddenly made aware that a wasp is buzzing within an inch or two of the back of our heads, and many of us are distinctly more comfortable when we see the said insect finally disappear through the open window ; but assuredly a higher degree of abject terror was

never reached by mortal man than was the case with the subject of the accompanying illustration! Not only wasps and ants, and such ilk, but spiders, beetles, or caterpillars, all appeared to affect his nerves in a manner that was pitiable to behold!

This old man used to live for, alas! he is dead now—at the pretty village of Sheringham, on the Norfolk coast, where he kept the queerest of old fusty toy-shops, alone in solitary state; and verily the immortal author of “The Old Curiosity Shop” could scarcely have found a more fitting subject for his inimitable pen!

The photograph, which has caught him in the characteristic attitude in which he was wont to spend a greater part of the day, was taken by a lady living in the neighbourhood, and by whose kind permission I reproduce it here.

Full of years, with an untidy shock of snowy hair, his wrinkled features puckered and fretted into a thousand creases, not much over *four* feet in height, with very long arms, and quite the largest feet I have ever seen, he might have been a weird bogey dropped from another planet! Those feet of his used to puzzle me considerably, for, when the crooked owner used to shamle off up the street in wrathful pursuit of small boys who would come and tease him, — although they never dared venture near,—it was really difficult to tell where the leg ended and the foot began, inasmuch as, on these occasions, his legs bent under him in a sort of half-circle, so that the feet appeared to be merely the continuation of the legs. Add to this that, when he walked, he kept his feet turned out so far that they were almost in a line, like the picture of the Carpenter in “Alice in Wonderland,”



"The Old Curiosity Shop."

and my readers may gather something of the extraordinary effect produced by this strangest of human creatures !

The old gentleman's extreme aversion for all things living was first brought to my notice one morning when, on passing his door, I was alarmed by the sound of a hoarse yell of unearthly character proceeding from the interior, which merged into a series of lesser howls, but which abruptly ceased as I hastened in at the open doorway, expecting, at least, to find that the poor old hermit had fallen into the fire in a fit ; for his uncertain conduct in the past had convinced me that it would be a matter for no great surprise if he were at any time compelled by a sudden seizure to shuffle off the very literal "mortal coil" in which his unique soul was wrapped ; and I was therefore not a little relieved to find him seated in his low chair by the fire, with the poker in one hand and the shovel in the other, gazing in evident horror at a small spider which was rapidly retreating across the floor.

On seeing me he relapsed into the incoherent mutterings that formed his usual mode of conversation, owing to the fact that he had no teeth left, and always talked with his mouth nearly shut to disguise the loss ; and it was only when he was particularly angry that it was at all possible to discover what he wanted to say.

Before I had time to interfere, a vigorous assault upon the unfortunate spider, with both weapons simultaneously, had summarily ended that person's career, and the hero returned to his chair, muttering imprecations upon the spirit of the deceased ! And the volumes of unintelligible abuse that rattled and tumbled from his cavernous jaws when I asked him what he did it for, accompanied by a dumb-show

performance with the poker and shovel, made me quite anxious lest he was about to repeat the process on myself!

A further acquaintance with the old chap showed me that he meted out similar treatment to every crawling thing that came within reach. Of flies alone he appeared not to be actually afraid, although he slaughtered unmercifully any individual that gave him the chance. It being then the month of October, the incursions of such enemies were naturally few and far between; but the warm weather, with its accompaniment of insect life, must have witnessed a continual pandemonium in the old shop if the eccentric patriarch kept up his animated conflicts on anything like the same scale!

Pitying his loneliness, and ineffectual struggles to light his fire with wet sticks, one terribly bitter morning—for our rooms were just across the way, and we used to derive much amusement from watching him from the windows—I ran across to help him. At first he thought I was coming to worry him—not that I ever had done so, but, living as he did in a narrow groove, of which the daily routine was a continual frustration of the assaults of his enemies (whether small boys or insects), the poor old thing had become abnormally suspicious; and, therefore, when he saw me coming, he prepared to repel the attack with his usual weapons—the poker and shovel. These I succeeded in dodging, and, producing a handful of *dry* sticks, as earnest of my peaceful intent, I persuaded the strange creature to let me come in and light the fire for him, to which he submitted with a very bad grace, and grumbled at me all the time.

Eventually he came to the conclusion that it was

rather a good idea, and would save himself much trouble; and consequently, from that day forward, during the remainder of my stay, a hoarse, unintelligible yell from across the road would summon me to repeat the performance every morning as soon as he came downstairs. It was in this way that I discovered something of what the old man lived upon, and other interesting items of his domestic arrangements; but, although I was ever ready to cheerfully light his fire for him, nothing would induce me to accept his repeated invitation to prepare his breakfast for him, consisting as it did solely of winkles! He obtained them from the fishermen, and would stew them in a great pan over the fire, afterwards eating them out of the same vessel with much relish, and audibly smacking his lips with pleasure!

On Sundays he never made his appearance until well on into the morning, so that he had perforce to dispense with my assistance upon those days; and we used to imagine, moreover, that his toilet was not a lengthy one, for he informed me with much glee that he had never had a bath but once in his life, and that was when he fell into a stream! His sabbatical attire consisted of a very long-tailed, seedy black coat and very long, richly wrinkled trousers; and, with the addition of a phenomenally high "top" hat and a huge weather-beaten umbrella of ancient design, he would start off at a rapid shamble up the street: neither did he appear on the scenes again until the next morning!

Where he went, and at what time of night he returned, I never could discover. He himself assured me that he walked to church at a place ten miles off; and, judging by the tremendous speed of his

crab-like shuffle, his statement as to the *distance* of his goal might be accepted ; but the variety and number of the expletives with which he was accustomed to embellish his utterances during the week, did not incline me to believe what he maintained was the *object* of his sabbatical shamble !

The contents of his musty shop were of a distinctly heterogeneous nature ; he seemed to keep everything, from a football to a needle ; and the variety of his stock of spades and buckets was admirably calculated to give him the monopoly of the trade. His wares were largely patronised by the many visitors who flocked to the place in the season, and generally paid the old Curiosity Shop a call, not so much for the sake of the articles contained therein,—although the blackberrying baskets and sticks were in genuine request,—as for the excitement of having dealings with so eccentric a character, and the exercise of intelligence required to understand what he was talking about !

If I chanced to be sitting in his chimney-corner when a customer came, I had frequently to act as interpreter ; for the aged body would sometimes get almost beside himself with fury at people who were slow at understanding him ; and I have seen him,—after being made to repeat a thing two or three times, each time in a more discordant shriek,—fairly hurl the article out of the open door, refusing to take payment for it in his rage, and following up his action with a savage rush of poker and shovel, which speedily dispersed the offender.

Afraid of none (except insects), he himself was the terror of the village urchins, although they dearly loved to tease him from a respectful—in fact, a *very*

respectful--distance. They appeared to have some name for him,—though I never could catch what it was,—which excited him to frenzy; and, on such occasions, it was no uncommon thing to see a kettle fly suddenly through the door, followed immediately by an infuriated figure, armed with the customary poker and shovel, who proceeded to chase his tormentors some way up the street! I trembled to think of what would be the result if he should ever succeed in catching one of them; but I suppose they knew they were fairly safe.

He was quick to discern whether his visitors came to purchase, or merely to satisfy their curiosity,—for he was quite the “lion” of the place, and people coming over from Cromer generally paid him a visit,—and unless the amount of their purchases came up to his standard, he would make no secret of what he thought of them, and scathing indeed were some of his most violent thrusts! A young lady with rather prominent front teeth was a bit too fond of teasing the old man, and one day she had apparently carried it too far, for—“Look ee 'ere, missie,” he roared, through toothless gums, in his thin, rasping tones, “I want ee to leave me summat in yer will, as I be took a fancy to.” “What's that, George?” replied the lady, wondering what was coming. “They two front teeth, missie,” croaked forth the answer, with a grating chuckle, “for me tombstones, one at me head, and t'other at me toe!”

On another occasion, the lord of the manor—who owned most of the country round—in the course of his morning ride, had stopped at the old man's door for a few words of greeting. At length he prepared to resume his way, finding that his tenant was in an

unusually grumpy mood, and that it was impossible to get anything out of him; so he turned his horse, with a final "Well, good morning, George; I must be getting on." "Y-c-a-u-o-w!" came a sort of long-drawn howl, "ee could a gone afore if ee'd liked!" and a vicious chuckle, was all the thanks his landlord received!

On Saturday nights, the old Jack-of-all-trades was in great request for the purpose of administering the weekly shave to the fishermen; and his room was full of them all the evening, awaiting their turn to undergo the operation; but I must admit that I should, for one, have been very sorry to trust myself to the tender mercies of a razor held by those erratic fingers; and occasionally huge gashes, marring the Sunday beauty of a stalwart fisherman, would testify that my fears were not altogether groundless. Twopence was the fee for the operation; and, if badly gashed, the customer was let off payment!

In striking contrast to this strange old hermit was another equally lonely recluse, whose acquaintance I had the privilege of making a few years ago, and not very long before his death. His name was, and still is—for the name of such a man as Canon Bernard Smith does not perish with his poor body—a household word in the world of insect-lovers. (He was a Roman Catholic priest, but had, I believe, long since retired from active service, being well over eighty when I first saw him.) A remarkable love of insects of all kinds was one of the most striking traits in a character as fine as it was unique; and many were the strange pets which he showed me, and to the comfort of which every corner and cranny of his little home seemed to be devoted;

while the plot of garden behind was fairly crammed with caterpillars, which he kept in large muslin bags, tied on the branches of trees.

He watched them all with affectionate care, and it seemed to me that his untiring attention was not by any means *only* with a view to the moths which they would eventually produce, but that the old man was *really* fond of them—as indeed was apparent, from the loving way in which he stroked them, when he took them out to show me. He certainly knew by sight every caterpillar in each bag, and every detail of its health and general behaviour!

Being somewhat too infirm to get about much, he used to employ the village children to hunt for caterpillars, and bring them to him, rewarding them with a few coppers for their trouble. Some of these youngsters, I am sorry to say, used to trade upon the kindness and decrepitude of their aged patron, being mean enough to sneak into his garden under cover of darkness, and steal the caterpillars out of the bags, and then have the audacity to bring them round for sale a second time; and the poor old man would thus perhaps pay for the same batch of caterpillars several times over!

But he was wily in his old age, and soon found out their knavish tricks, by recognising a particular favourite when it was brought back to him a second time! He said not a word, but his little eyes twinkled as he took me out into the shrubbery to inspect the scheme he had prepared to revenge himself upon the thieves. And there, in the middle of the path, which the children would have to take, ere they could reach the treasure-laden trees, was a substantial pit, skilfully covered over with brittle sticks and leaves,

so that the presence of an ambuscade might be satisfactorily concealed from the eyes of the trespassers ! A good-natured labourer had been persuaded to prepare the surprise, I was told ; and had spent several hours at it after his day's work was over, and had evidently thoroughly entered into the fun of the thing.

The kindly old fellow chuckled gleefully at the thought of paying out the perpetrators of so mean an advantage upon his age and kindness, as he guided me past the whereabouts of the hidden danger—for so skilfully had the leaves and sticks been spread along the entire path that it would have been quite impossible to locate the exact spot where the trap was laid, were it not for the fact that he had taken the precaution to mark one of the bushes at the side.

The aged priest then took me on to see some of his pet caterpillars, and it was quite pathetic to see how fond he was of them, stroking them, and pouring out in soft cooing tones an endless stream of endearing epithets ; and no less remarkable was the manner in which he seemed able to distinguish each individual from perhaps a score or more of the same species !

The inspection over, we duly returned ; and how it happened I don't know, as I was walking in front, but I expect the poor old thing must either have tripped over his cassock, or forgotten the locality of his pitfall—anyhow I heard a sudden crash behind me, followed by a smothered gurgle, as I hurried to the assistance of the prostrate form, thoroughly mixed up in a heterogeneous assortment of cassock, sticks and leaves, grovelling at the bottom of his own trap !

Luckily he was none the worse, for he was a tough old body, and the pit was not really deep ; so, after hauling him out, I helped him to cover over the

top afresh, in readiness for his intended victims. Moreover, I deemed it as well to see the gentle schemer safely past the obstruction before I left him, and to extract a promise that he would give the spot a wide berth in future !

The illustration below represents some caterpillars of the Small White butterfly in their natural resting position upon the leaf of their food-plant ; and it is noticeable how they lie along the midrib of the leaf, in order that their resemblance to it may render them the less easily seen by their enemies. At the head of this chapter will be seen a group of five moths resting among dead leaves, which they so closely resemble as to be hardly distinguishable.



Caterpillars of the "Small White" butterfly, imitating the mid-rib of the leaf.



The cradle of the Humming-bird.

PART V

BIGGER BEASTIES

CHAPTER I

JOTTINGS FROM OTHER NURSERIES

IT was not my intention to dwell upon the larger members of the animal creation and their nurseries to any great extent in this volume. There is surely no necessity to do so, for many of my readers must have a more or less vivid recollection of some occasion when they had a decidedly stormy encounter with an old farm cat, as a result of their presuming to meddle with a nursery of warm, fluffy balls smuggled away in a hay-loft ; or the rapid retreat, which they considered advisable, in the event of a warning growl from the direction of the weather-beaten kennel, in

the corner of the yard, whither they had been attracted,—and perhaps approached too incautiously,—by the novel sound of queer squeaks and snozzling utterances, which proclaimed that Mrs. Collie was to be congratulated on having recently become a proud mother.

Neither do we need any recommendation not to interfere—or, indeed, enter the same field, very often—with the farmer's dappled cow, if she should have lately become the conceited owner of a straddle-legged youngster: inasmuch as, in spite of the demure appearance which she may present, as she stands gazing with a mother's pride at her new-found treasure, she is a firm believer in the old adage that "Two's company, three's none," and would probably take prompt measures to impress the fact upon any intruder; for she is terribly suspicious, and seems to imagine that every innocent individual who ventures within half a mile must of necessity have designs against the welfare of her precious baby!

Our mutual friend Mr. Punch, talking of rustic superstitions, remarks jocosely that "Dorsetshire folk firmly believe that if they meet a mad bull on New Year's morning, it is an almost certain sign that they will shortly go on a journey!" Very likely; and he might have added that the chances of a compulsory aerial trip—and not exactly free of *charge* either—would be equally great if one were to come across one of those pleasant-mannered cows with the curious delusion firmly rooted in her head that one's sole reason for sauntering across the field must be the intention of throwing a bomb at her beloved calf!

Now, if *domestic* animals prove such faithful nurses,

and guard with such jealous care the babies with which Nature has provided them, we may be sure that animals in a *natural* state—in which their “hand is against every man, and every man’s hand against” them—would be still more ready to oppose any attempt at interference with their families.

With this object every one, from the meanest to



The nursery of the Dormouse

the greatest, systematically hides her nursery from the public view; as, in the accompanying illustration of the cradle of the Dormouse, which I found snugly ensconced beneath the rich foliage of a luxuriant bower of hop-vines, and we can even see the nose and whiskers of one of the youngsters just inside the opening. Few, however, have such an ingenious method as that employed by the

mother kangaroo, who carries her infant about in a pocket specially designed for its accommodation!

I include an illustration of a Dormouse which I found in my garden last winter, coiled up inside a wee nest which it had constructed inside a heap of straw.

Emulating the example of its larger cousin, the bear, this charming little animal spends some six



Dormouse in its winter sleep.

months of the year wrapped in a profound sleep. Motionless—save for the rhythmical heaving of the furry body, as it draws its deep, long breaths—the sleeper is by no means silent, inasmuch as it emits a terrific snoring which can be heard across a fair-sized room! The specimen here depicted included a shrill note in its somnolent wheeze --infinitely small, though quite distinct—and the noise produced was really tremendous for its diminutive size!

Cold to the touch, and apparently lifeless, the little

yellow body might, to all intents and purposes, be that of some cold-blooded animal ; and it may be even rolled about the room without attempting to uncurl its tightly folded form, or evince the faintest signs of returning animation !

Naught but the voice of Spring will open once more the great pathetic eyes—for all the world like a couple of black boot-buttons !—or rouse into being the active life which lies dormant in the sluggish limbs !

Neither shall I discuss here the ways and means by which the pretty little feathered nurses around us hide their babies from their enemies—a subject of which I have already treated in “Nature’s Riddles” ; and, moreover, the events connected with the birth and subsequent development of such infants differ only in the smallest detail from the nursery days of the domestic chicken, to whom we have already been introduced in a former chapter. I will, therefore, merely introduce an illustration showing the cradle of a Humming-bird, and another of the nursery of the Golden-crested Wren, suspended in wondrous fashion from beneath the protecting bough of an *Arbor vite*, and exquisitely concealed amid the hanging sprays.

The same analogy, indeed, holds good in the feathered world, and we are afforded ample evidence of the efficiency which must distinguish the nurses in a wild state, when we see the conscientiousness exhibited in our own poultry-yards ; and here we may frequently observe the most amusing incidents in connection therewith. A hen will strongly resent any interference when she is sitting on her eggs ; and even if she does not severely punish the fingers of the intruder, her ruffled feathers and angry exclamations

show pretty clearly what she thinks of him ; and, later on, when she is the proud owner of a brood of fluffy mites, she will not hesitate to fly at any one or anything that attempts to touch one of them !

A glance at the lady in the accompanying illustra-



"Mind your own business.

tion is sufficient to show that she is not exactly pressing one to go nearer ; in fact, it was quite evident at the time that she was hurriedly turning over in her mind the consideration as to which was likely to be the most vulnerable part of my camera, with a view to a speedy settlement of her doubts !

I once had a particularly fierce Wyandotte mother,

who would never let me put my hand under her without making a furious grab at it; she inspired a holy terror in the heart of the old gardener who worked for me in those days,—a worthy soul, but somewhat timorous,—and nothing would induce him to go near her when she was sitting. This idiosyncrasy I discovered one morning when I was attending to another hen, and had called across to him, "Lift the



The "Tiger."

Wyandotte off, will you?" but was met with some hesitation, and then the artful excuse, in a voice choked with emotion, "I reckon you understands her best, sir!"

On another occasion I noticed that he had apparently forgotten to let out the hen and chickens (which appear in the accompanying illustration)

on the second morning after they had been transferred from their coop to a larger run. This particular bird—unlike the majority of hens, when in charge of a family—was one of the tamest and mildest-mannered individuals that I have ever known, as, indeed, may be gathered from the exceptionally benevolent expression which she is wearing in the picture, in spite of the disturbing presence of my camera within three feet of her nose; in fact, she would not make the slightest objection to my picking up her chickens whenever

I liked, and even stroking her as well; and I was therefore totally unprepared for the announcement, in reply to my inquiry, "Don't care about letting of 'er out; she do go for me like a tiger!"

The same venerable person would at times give utterance to the most truly astonishing statements; and, as I have introduced him to my readers, I may perhaps pass on to them a striking piece of historical (or horticultural) information with which he favoured me one summer. The selection of some pansies for a border in the garden was under discussion, and the worthy knight of the spade appeared very anxious that I should give a trial to certain varieties which he fancied, and especially one dark species, whose merits he expatiated upon, but whose name he could not remember.

For some time he racked the inner recesses of his brain, a process which was evidently fraught with such anguish of mind that I was about to suggest that we should change the subject, when at length a gleam of recollection lit up his rugged features, as the lost title began to dawn upon him, and then "I've got 'im!" he exclaimed in triumph, "It be the same name as one of them Queens!" following up this announcement with a series of incoherent mutterings, suggestive of a Board School infant trying to pronounce a difficult word. "Elizabeth?" I ventured, although I scarcely thought it sounded suitable for a pansy. "No, no, that wasn't 'er," and the rich purple which suffused his face, occasioned by the mental struggle within, became momentarily deeper, while the veins stood out like whipcord upon the furrowed forehead; "I knows the name," he continued, taking off his cap to assist the process, "well as me own." My suggestion

of Mary was rejected with scorn. "It be that there Queen what beheaded something," he explained at last. For some reason or other I was inspired to try Anne Boleyn. "That's 'er! that's 'er, sure enough! Han Bullin, that's 'er! I said as 'ow I should get 'er in a minnit!" and the symptoms of apoplexy gradually receded from his honest countenance as he heaved a deep sigh of genuine relief.



Dignity and Impudence.

The extent of that man's botanical knowledge was calculated to make one shudder sometimes at the thought of one's own ignorance. Another day I was turning over the pages of a florist's catalogue with a view to ordering the annual supply of vegetable seeds for the ensuing season, and the worthy son of toil was following me with greedy eye; for if there was one thing he loved above all others it was the chance of poring over a catalogue of seeds.

We had settled the list, with the exception of the

peas, which had not proved an unqualified success the year before, owing to the partial failure of one species which I had tried in deference to the entreaties of my venerable retainer, and I had therefore decided to make a new selection. But it is no easy matter to make up one's mind which to choose from a list of some scores of names, each one "highly recommended," or "one of the finest introductions of recent years," and words to that effect; and the difficulty of my choice was accentuated by having to politely ignore an occasional furtive whisper of some purely mythical name, much too fanciful even for a catalogue, and which could only have existed in the fertile imagination of the whisperer.

At length I turned over a leaf and came upon a full-page illustration depicting a gigantic pod, crammed—like the proverbial sardines in a barrel—with peas about the size of chestnuts. The monstrosity rejoiced in the unassuming name of "D---e's Champion Selected English Wonder," and upon the opposite page was a striking array of medals and prizes which the precocious vegetable was alleged to have won at different shows, followed by a long list of some two hundred places and towns where the pea had become famous.

Now was the old fellow's moment of triumph, and, pointing with a grimy finger to the list of towns, he exclaimed in tones which trembled with emotion, "*Them's all good sorts!*"

"What's in a name!" as England's greatest bard is reported to have said; but there was a good deal in the name which I was fain to bestow upon the misguided, though, I hope, well-meaning individual, on another occasion, when I discovered that he had spent

a whole morning in transplanting a particularly delicate Maréchal Niel from the greenhouse, and elaborately nailing it upon the north wall of the house! I had wondered whatever form of amusement he could have been indulging in which could necessitate the con-



The hammock of the Golden crested Wren.

tinuous knocking which had worried me not a little, while writing in my study on the other side of the wall in question; and when at last, in despair, I went out to ascertain the cause, I found the perpetrator thereof surveying his handiwork with an expression of conscious pride, and evidently expecting to be complimented for the marvellous symmetry

with which each twig was nailed to the wall at equal distances !

It must have been a great shock to his sensitive feelings to be greeted with the torrents of reproach with which I assailed him, in lieu of the commendation which he doubtless anticipated. "Did you think it would live in that exposed position?" I exclaimed with some heat, as a gust of our special brand of North-Easter whistled round the corner, chivying the dead leaves along the gravel, and rudely shaking the delicate foliage of the rose-tree. "He would 'ave died anyway," was the astonishing rejoinder, which was brought out in such an injured tone that I felt positively uncomfortable, as if it was some new form of logic that I had not the wit to understand, and was making a fool of myself by not doing so.

I often tried to unravel the complex motives for some of his actions, and it has occurred to me since, that possibly the crucifixion of the Maréchal Niel might have been intended as a last despairing endeavour to get rid of the green-fly that had attacked the plant that year, and had hitherto resisted all his mild efforts to get rid of it, and that in his excitement it never occurred to him to consider whether such a drastic form of treatment could injure the *tree*!

To return to the warlike Wyandotte, ere she become offended at being left so long in the cold.

If she guarded her *eggs* with such jealous care, it was nothing short of feverish anxiety which she exhibited if any one approached to within a measurable distance of the chickens which were subsequently entrusted to her charge. This hen and her brood were allowed the run of a large enclosed space quite

near the house, and one morning, just as I had finished persuading the refractory moth at the end of this chapter to sit still while I took his portrait for a series on "Protective Colouring,"—the result, by the way, being so gratifying that it seems worthy of reproduction,—I was suddenly interrupted by a shrill note of alarm from the neighbourhood of the chicks, and on hurrying to the spot I was just in time to witness a most thrilling encounter between a large piebald cat and the valiant nurse; I call her "nurse" because she had been given other people's eggs to sit upon, so that none of her chicks were, strictly speaking, her own children.

The cat had somehow managed to scramble over the wire surrounding the enclosure, and had evidently commenced hostilities by making a dash at one of the chicks which had been foolhardy enough to stray from the others; but she was not quick enough to outwit the enraged hen, who ruffled out her feathers until she looked more like a porcupine than a sober-minded fowl, and it is astonishing how formidable a hen can contrive to appear on such occasions, if necessity demands,—and she forthwith went for the cat like a torpedo! The latter tried to dodge her, but in vain; and a second fierce onslaught, in which it seemed that the bird employed her beak, claws, and outstretched wings simultaneously, evidently brought the cat to the conclusion that it was running some risk of disfigurement in doing battle with so furious a harpy, and the ignominious nature of its retreat was consequently only equalled by its rapidity!

I have seldom seen such an aspect of concentrated ferocity as that depicted by the outraged hen, as she tore after the figure of her vanishing enemy; and

the cat must have had a lesson that it did not easily forget, for I never saw it in the vicinity again. Now if that animal had only had the sense to employ a confederate, who could have drawn off the hen while she pocketed the chickens, what a royal feast they could have had together afterwards from their "own selection"—as florists say in their catalogues—of the frightened infants, which had remained huddled up in a corner, watching the proceedings.

How seldom it is that one sees any *combination* amongst animals! "Every one for himself" is the almost universal motto among them; but if only the silly things were to occasionally ally their forces, how immensely they would score! This is the day of universal "Trusts"; and if the cats were to form a "Chicken Trust,"—not taking the word in the sense *usually* applied to chickens!—or if the neighbourly rats were to form an "Egg Combine," it would be a poor look-out for the poultry-keepers!

I had a curious experience with another brood of chickens later on in the same year. The infants were about half-grown when their nurse was driven away by a very fine Black Minorca cock, who took complete possession of the youngsters himself, literally "taking them under his wing," and thenceforward looking after them with the tenderest solicitude for a period of some weeks.

The strange part of the alliance was that the chickens did not seem to miss their former nurse in the least, when once I had removed them to a separate enclosure in order to avoid discord, but at once took to their self-constituted champion with the utmost contentment, and it was the most ridiculous sight to see him standing still on his long legs,—for he had

not the sense to crouch down, after the manner of a hen when she gathers her chickens under her wings,—while a forest of little legs could be seen all around his own, like a crowd of saplings about two stalwart trees, as the chicks stretched upwards to their utmost extent in order to reach up and get their heads, and as much as possible of their bodies, under the feathers of their strange protector.

The cock further showed his ignorance of the



The Cock and his charges. "Wish they would hurry up with breakfast!"

qualifications of an experienced nurse by persisting in his natural desire to mount a perch at roosting-time, whither the chickens would follow him, and cram themselves together upon the perch by his side, stuffing their little bodies as best they could under what feathers they could get at, with many a squabble for the best place. Thus I would find the incongruous assembly when I went to shut them up for the night—the cock with his feathers stretched

out to the most abnormal extent on either side, and a look of ridiculous contentment on his face, while the chickens crooned softly to themselves in that delicious soft undertone which they only use when settling down together for the night.

Another hen of mine once exhibited a degree of heroism, under very trying circumstances, which was



A quiet meal.

most commendable. Her nest was situated in a large shallow box, behind some faggots in the garden, and she had already been sitting for nearly a fortnight, so that her day of deliverance was close at hand. One morning, however, when I went out to visit her as usual, I discovered her nest in a state of the wildest confusion, the poor hen herself being dismally huddled up in one corner of the box, instead of being comfort-

ably settled in the middle of it. On her face was an expression of piteous anguish, in place of the appearance of supreme composure which it generally wore ; and, moreover, her comb and wattles were profusely sprinkled with blood.

She kept her head turned in the direction of the opposite corner of the box, and every now and then she partially got up, while the feathers on her neck stood out and literally bristled with rage. On lifting her off, I saw at once that there only remained five out of the thirteen beautiful eggs which she had had the day before, and a further examination of the tangled mass of hay at the other end of the box revealed the recumbent form of a portly hedgehog curled up snugly beneath it, contentedly snoring ; while the comfortable appearance of the beast left no doubt as to the whereabouts of the missing eggs !

The poor little nurse had evidently had a fierce battle with her strange assailant in the defence of her precious charges, as was testified by the condition of her bleeding face ; but she would of course be powerless against the cruel prickles of her adversary, who was consequently able to abstract as many eggs as he pleased ; in fact, carried away by the delicacy of the banquet, he had "supped not wisely, but too well," for it would have been the more sensible course to have made off before he was caught on the scene of his nocturnal orgy. However, there he was ; so I promptly took him in charge, greatly to the relief of the plucky hen, and I took care to afford the miscreant no further opportunities of disturbing the brave bird and her nursery, or of gratifying his taste for omelette in future. The hen was rewarded for her zeal, as I gave her the eggs of another sitter who had proved

herself quite unworthy of the responsibilities of a nursery, and whose eggs had reached the same stage of incubation.

Before we leave the subject of this plucky hen, I must mention a curious incident in connection with her which affords a striking instance of hereditary instinct. This bird was prettily marked with various shades of brown, after the fashion of a partridge, and she always evinced a decided partiality for laying in a faggot-heap, in a nest which she had made for herself in one of its recesses, quite secluded and never discovered by any of the other fowls. Her own eggs being rather small, I did not usually keep them for hatching; but one of them was included in a sitting, to replace a broken one, and brought out under another hen in the hatching-house, far away from the spot where it was laid.

This egg produced a hen-bird, which in due time grew up to be almost the image of her mother, and was put out into the poultry-yard with the others when she was old enough. After a time she became ready to lay, whereupon she sought out the old nest which her mother had used, and laid her first egg in the identical spot! Her parent was dead, and therefore could not have shown her the place, and none of the other fowls had ever laid there; so we can only conclude that it was her instinct that led her to it. She forsook the nest after she had laid three or four eggs in it, however, and took to the fowl-house like a rational being.

We left the valiant hen snugly ensconced in a newly made bed, and quite happy with another set of eggs. The hedgehog was shut up in durance vile for a day or two to recover from the indigestion which I hoped

he felt after his enormous meal, and to give him an opportunity to meditate over his sins. He was then relegated to the ranks of my "happy family," which already comprised another hedgehog, two tortoises, an ancient hen, an enormous Roman snail, and a fat rabbit!

It was extremely diverting to watch the antics of this motley assembly. The rabbit usually started the



On guard.

ball rolling by making a sudden rush at the unsuspecting hen, who would utter an absurd sort of shriek and dash off round the enclosure in which they resided, probably tripping over one of the hedgehogs asleep in a corner. This would have the effect of increasing her alarm, besides considerably disconcerting the hedgehog, who much objected to being waked out of his beauty-sleep, and would promptly shamle off to another corner, as often as not upsetting the snail on his way, —if the cabbage-stalk he happened to be sucking was anywhere in that direction,—or

causing the tortoise, who was probably already in the corner, to rapidly "shut up shop."

Harmony was only restored by my throwing in a fresh cabbage-leaf or some such morsel of succulent green, when peace reigned once more. However, it was necessary to let these dainty morsels fall pretty near the snail, or he naturally would not have had much of a "look-in," as the rabbit and hen would



"Don't mind a bit myself."

certainly have made short work of them long before he so much as got there.

The general idea of happiness in this odd community seemed to consist in the possession of a corner ; but as each member was afraid of the others, and there were only four corners, it was a preference that led to frequent friction. The hen was certainly horribly afraid of the rabbit ; the rabbit hated the sight of the hedgehogs ; the tortoises shut up at once if any one else came near,—even if the snail sauntered past in his own leisurely fashion,—while the hedge-

hogs hid their faces if any of the others so much as moved!

The snail was perhaps the most brazen member of the society; for,—although it took him some time to make up his mind to come out of his shell,—when once he was out he was positively bold; and if he encountered one of the others he would merely draw in the horn on that side for a moment, and sail off in another direction.

I feel sure that the rabbit must have had a vein of humour lurking somewhere at the back of his long head; for he would most deliberately lie in wait for the hen, in order to have the fun of jumping out at her as she passed: for I repeatedly watched him do this, and am convinced that he could have had no other object than the pleasure of seeing the hen scamper away in alarm.

It is hardly necessary to add that it was some little while before this incongruous group of beasts became sufficiently reconciled to tolerate each other's presence without having spasms; but in time it was no uncommon thing to find several of them sunning themselves in the same corner together quite amicably, and evidently on the best of terms.

The community melted away by degrees, and, as I was shortly going to Switzerland, I did not trouble to fill up the vacancies. One of the tortoises died, I believe, of sunstroke; the hen began to lay, and was therefore allowed to rejoin the ranks of her friends; both the hedgehogs died eventually from some reason or other—possibly from over-eating, or because they might have considered that even death was preferable to being condemned to live alone with a snail! So at length the latter creature had the place to himself,

where I found him still alive and well on my return from abroad, having subsisted apparently upon the plentiful supply of green food afforded by the crop resulting from the remains of the hen's corn, which had taken root and sprung up.

The snail in question belonged to that species with enormous shells, of a dark yellow or brown hue, usually found upon chalky soils, and which are said to have been introduced by the Romans. They are quite distinct from any other British species, and frequently attain to nearly double the size of the ordinary garden snail; in fact, the specimen which I have been describing was so large that it could not possibly squeeze its shell through the $1\frac{1}{2}$ inch mesh of the wire netting with which the enclosure of the "happy family" was surrounded, to which fact entirely was its long imprisonment due.

When I was a small boy I kept a number of these snails as pets (!), and they lived in a cardboard box, upon the outside of which the large characters announcing the name, together with a life-size representation, of somebody's candles, are still vividly imprinted upon the tablets of my memory. I used to train them—the snails, not the candles—to draw a diminutive carriage, which I had manufactured for the purpose out of cardboard, and to which they were fastened with a complete set of harness elaborately constructed out of black thread. By dint of much patience I at length succeeded in obtaining a really manageable "four-in-hand," which would draw their carriage the whole length of a long board with the help of a cabbage-leaf held in front of them, and sundry judicious pokes from a small stick during the progress of the journey. I used, moreover, to give

regular "snail-shows" for the benefit of visitors and friends of my parents who came to the house.

At first I experienced some difficulty in persuading the occupants of my unique "stable" to come out of their shells when I wanted to give a performance, until I discovered that the refractory steed would always emerge with great rapidity if held for a moment under a toy pump and vigorously pumped on! This process invariably had the desired effect, though the poor deluded snail must have been sadly disappointed to find itself promptly harnessed, instead of being able to enjoy the refreshing bath which the trickling of the water had doubtless led it to anticipate!

Some of Nature's nurses evince a most curious, as well as reprehensible, eccentricity with regard to the management of their nurseries; for, should any danger threaten the babies, the anxious mother will at once lose her head completely, and promptly swallow the infants!

This is a habit which I should imagine would hardly be tolerated to any great extent amongst the human species; and I can quite fancy that if any of my readers were to come in one evening and hear that the nurse had been exhibiting signs of an inclination to swallow the baby,—however great may have been the danger which it was in on the occasion,—they would be sorely tempted to give her notice. And should the mother of any human baby manifest a desire to treat her offspring as a pill,—even though they might have been in the path of a runaway motor-car at the time,—I am inclined to think that the fond father of the baby would seriously consider

the expediency of taking his wife to visit a brain specialist on the first opportunity!

Be that as it may, there is nothing to hinder Brer Rabbit's spouse from swallowing her charges ; and, if she should be disturbed while her infants are still in the hairless and objectionable "skinny" stage, down they will go without any hesitation ! Of course, it may be because she is ashamed of being the mother of such ugly little beasts, and, as long as they are not observed, she thinks they might as well be given a chance ; but once they are seen, her reputation in the community would be at stake, so she decides to remove at once any objects that might cause aspersions to be cast upon her progeny by the mothers of maturer brown-coated families !

Nurse Mouse is another lady who is subject to this little idiosyncrasy ; but she must surely suffer uncomfortable feelings in the region of her inside after bolting a family of eight or nine sturdy youngsters—and sometimes even more—albeit they are but three-quarters of an inch long, and no bigger round than a pencil ! This habit in mice was first brought home to me with great force and bitterness of mind many years ago ; and it was as much as I could do to restrain a tear of mingled disappointment and rage when I discovered one morning that a cherished family of two-day-old mice, nine in number, had bodily disappeared ; presumably because I had ventured to peep into the nest the day before, and had chanced to annoy the mouse by giving way to an outburst of delight at the discovery of the additions to my menagerie !

Rats also will swallow their young at the slightest provocation. •

Oh, how I hate rats ! However much some natural-

ists may desire to "crack them up,"—and I don't reckon there are many who would,—I have never discovered one redeeming feature in the character of the common rat! It is true that they are famous scavengers, and will eat up a lot of refuse which would otherwise putrefy and create an unpleasant odour, carrying the germs of plague and disease in its train; but we can hardly say that therein lies any credit to the rats, inasmuch as this tendency on their part is certainly not born of any laudable desire to benefit



Rat's head in trap.

the human race, but simply because their degraded taste leads them to look upon such filthy garbage in the light of the greatest delicacy!

I reproduce here the photograph of a rat's *head* in a spring trap.

We generally expect to find a *whole* rat when we are lucky enough to catch one in a trap, or, at any rate, not more than a piece of its tail missing; but on this occasion the other rats, following their instinct, actually consumed the entire body of their dead friend, and his head was all that I found in the

morning! Probably they only left this because it was fastened down under the spring of the trap, and the others would not like to meddle with it,—not understanding the mechanism of traps,—in case it should go off again and catch them too!

But for astuteness and diabolical cunning, give me the rat!—or, rather, don't, as I have enough on the place already, and only this afternoon my gentle gardener has been liberally bespattering himself and everything else with volumes of tar in a determined—though, I fear, futile—attempt to keep the wretched creatures out of the poultry-yard!

The rat must undoubtedly be ranked amongst the greatest enemies of Nature's nursery. This rapacious rodent will climb up into the hedges and bushes at night, and rob the feathered songsters of their callow nestlings; he will make a raid upon a rabbit's nest in a woodland bank, and steal the plumpest of the family; he will commit havoc among chickens and ducklings, if he can get at them, killing all he can, simply in order to suck their blood, and leave the quivering bodies on the ground,—not to speak of carrying off the eggs from under the very eyes of the hen who is sitting on them! This I have known them do on more than one occasion,—not with my own birds, however, as I have long ago learned that the only protection against these blood-thirsty villains is to keep the sitting hens in a rat-proof enclosure,—and the manner in which the theft is accomplished is very ingenious; for one rat will clasp the egg with his four legs, while another will take hold of him by the tail and drag him off to a place of safety, where they will together revel in the plunder!

They are, moreover, so artful that they will soon

get used to traps and poison, and will avoid them like the plague. Frank Buckland, that prince of naturalists, mentions a case where poison had been put down for rats, and a couple of veterans were actually seen to drive away their young ones from the stuff, and then to wall up the spot with earth and débris, so that they could have no chance of getting at it again!

Mr. Buckland also tells an extraordinary story, in his "Curiosities of Natural History," to show the marvellous cunning of this rapacious animal: "A medical gentleman who lived in the neighbourhood of these downs, tells me that on one occasion preparations were made to ferret and destroy all the rats in a barn near Weston. The next morning the company came—ferrets, dogs, big sticks and all—but not a rat could be found. In vain the ferrets poked in and out of the holes, in vain the dogs routed under the straw, in vain the men brandished their sticks. The rats were all gone; not one solitary individual remained. We can but conclude that, from former experience, some of the patriarchs among the rats, observing the preparations made, had advised a general change of quarters, and their advice had been taken by the whole colony. Curiously enough, my friend afterwards ascertained from a labourer that he had met a regiment of rats very early in the morning of the day the hunt was to have taken place in the Weston barn, marching along Chiltern bottom towards a barn situated some miles away."

I can quite believe this remarkable story; and the more readily from the fact that I have had very much the same experience in my own garden—the rats swarming in scores, until one night when the rat-catcher arrived and spread his nets in position, when



A warning to the greedy.

not a rat could be seen anywhere, although the next night they were out again "as plentiful as blackberries!"

The illustration above, entitled "A Warning to the Greedy," shows a somewhat unusual capture for a rat-trap. The instrument was placed at the mouth of a rat-hole; but two huge field-mice apparently must have had a race to see which could reach the coveted bait first, regardless of consequences, and, arriving at the spot a "dead-heat," both perished together as a result of their greediness!



Two Moths at rest on a twig.

CHAPTER II

CHILDISH AMENITIES

Now, before we bid farewell in these pages to the charming occupants of Nature's nursery, it seems only fair that some brief reference should be made to the nursery of the human animal, although the engaging mites who clamber round our legs, or whisper the sweetest baby-nothings in our ears, or—I might add, if there is no fond mother within earshot—who make us occasionally wish them at the bottom of the sea, when the baby-music is turned on extra strong at the particularly clammy hour of 2 a.m.—do not, strictly speaking, come within the scope of our title! Nevertheless it would somehow seem like a slight if no mention whatever were made of them; and I will therefore pay my tribute by first introducing to my readers one of the sweetest children it has been my privilege to know, and who appears in her mother's arms in the accompanying illustration; and I will now ask them to further bear with me a few moments while we interview the little maiden, who may be seen in the next illustration.

Tender were her years, and lamb-like the expression of innocence which peeped from beneath a bewitching sun-bonnet—when any one was looking—but busily at work was the little mind within, hatching

some new wickedness! Even at that early age she had developed a will that would not be baulked, and if she did not wish to do a thing—well, she didn't do it!

The little lady cherished a rooted objection to



"Yes, sir, she's getting a goodish weight now."

medicine, and she would contrive to be out of doors, if possible, when the mixture came on its accustomed round, in order that she might the more easily anoint the flower-beds therewith. One morning, however, the black poodle—which accompanies her in the picture, and must not be mistaken for the child's

shadow—took it into its head to rush upstairs and into the schoolroom, followed closely by its little mistress, just at the inopportune moment when the worthy governess had prepared the hated draught, and was about to descend, with the object of administering it to her wayward charge. She had, indeed, run into the jaws of the lion! The window was shut, neither was there anywhere she could throw the medicine, without the risk of being discovered; and she intensely disliked being found out in any iniquity, not so much because she dreaded the penalty thereof, for she cared not a jot for punishment, but because it would lower her prestige; and the chief charm, in her eyes, to be found in the perpetration of a wicked deed lay in its successful disguise. Indeed, so clever was she in accomplishing this object, that most of her sins would never have come to light at all, had she not at times betrayed herself by giving way to a childish weakness for boasting of them afterwards to some boon companions among her playmates; and not a few of the stories thus found their way to my ears.

On the occasion in question she was not a whit abashed. The little brain worked for one instant with lightning rapidity; and, taking the glass from her demure and bespectacled custodian, with a sweet smile, and not a moment's hesitation, the artful child turned her back, calmly emptied the contents of the glass on to the fluffy shoulders of the dog, and replaced the empty vessel on the table, with a wry face to help the illusion! The sentiments of the dog, as he felt the nauseous mixture trickling through his fur, have not transpired, but they must have been positively entrancing!

The same delightful child found me, one beautiful summer morning, under an elm-tree in the garden, where I was watching the antics of a squirrel while I awaited the summons of the breakfast-bell. She was soon perched upon one of my knees, from which coign of vantage she forthwith regaled me with a running fire of questions upon every subject under the sun, and, childlike, scarcely waited for the answer to one before she came out with the next! My answers appeared, at any rate, to afford her a certain amount of entertainment, for there she was awaiting me the next morning, and thenceforward repeated the performance whenever the weather permitted her to be out.

Frequently, during these interviews, we would hear the clarion tones of the distracted governess, proceeding from an upper window, in a vain attempt to discover the whereabouts of her charge; but without, having the slightest effect upon the little maiden's flow of chatter, beyond an occasional fleeting smile when the poor lady's voice sounded more than usually excited; and—be it said to my lasting shame—I made no attempt to prevail upon my little companion to obey the summons!

One morning, however, she astonished me by pausing suddenly, directly the well-known voice was heard; and I began to think that she was actually going to forget herself so far as to be obedient for once. But no! the small mind was hard at work over some train of thought, which I forbore to disturb; and not until the shrill tones had reached the frantic stage, and e'en died away, did she emerge from her reverie. Then a broad grin gradually overspread her face, and she announced

in a tone of triumph, "You know, Miss —— [the governess] *does not know we meet like this!*"

I thought that was pretty good for seven years old, and made a mental note of the fact.

Moreover, I have seldom met any man, woman, or,



"What mischief can I do next?"

much less, child, who possessed such perfect control over the features when about to play a practical joke upon any one; and it was largely owing to this accomplishment that so many of her attempts were successful. So different was her demeanour on these occasions to that of most children, who usually advertise their intention by continued giggling, or, at any

rate, "give the show away" by the overdone air of mystery they assume, that I fell a ready victim, when the child blandly approached me one day with a box of chocolate creams, which she was steadily munching; and holding them out towards me, pointed to one of the dainty morsels, and, with an expression of the utmost indifference, remarked, "That's a nice sort."

The first bite was quite sufficient to assure me that the interior of that chocolate was composed of *soap*!

Being determined that on that occasion, at any rate, the cunning child should be cheated of her triumph, with an awful effort I swallowed the thing whole, and held out my hand for another, with which I more or less succeeded in drowning the taste of the last. That first bite was a fearful moment, but it was quite worth it--and the subsequent unpleasant pains which troubled me inside-- to see the expression of blank astonishment that succeeded the apparent failure of her plot, and the puzzled air with which the little maiden walked away and proceeded to examine the remaining chocolates to ascertain whether I could have possibly not taken the "loaded" one after all!

EPILOGUE

THERE is a wonderful mother-instinct about Nature's nurses, and it is a beautiful sight to watch a happy family of babies sporting around their admiring and devoted parent, as she lies peacefully dozing in the midst of them, ever and anon rousing herself to give a fondling lick to one or other of the blithesome babes, which, tired of its play, cuddles into her protecting bosom.

Such a sight it has been my privilege to behold under exceptional conditions, upon a grassy slope which breaks out from the side of a gigantic Swiss mountain—no other than the mighty Jungfrau—where a couple of timid Chamois nurses lay chewing the cud in peaceful security upon the velvet sward of their rock-bound nursery.

There is, of course, no need to go further than our own country fields to see some quite enchanting nurseries, for here we may look upon the gambols of fluffy lambs sporting around their mothers,—who, to my mind, generally look rather bored,—or the awkward contortions of a straddle-legged calf endeavouring to stand on its head, while its mother looks on approvingly ; and we are all familiar with the grotesquely charming antics of a family of kittens, or a nursery of puppies. • But assuredly there is not the same fascination as when one comes across one of Nature's

families in the seclusion of their own wild surroundings; and the delight of obtaining such a peep into their home life is increased tenfold by the knowledge that they are blissfully unconscious of the presence of any alien eyes to witness their domestic happiness.

The grassy promontory upon which these chamois had fixed their abode was well-nigh unattainable by any foot but those of their own nimble race, jutting out as it does from the sheer precipitous side of the solid rock; and how they could ever have obtained access to this beautiful oasis, or would ever get off again, was a mystery that I made no attempt to fathom! I spied them out from the opposite side of the ravine, where I lay resting for a moment to recover my breath after a headlong scramble in pursuit of one of the graceful Apollo butterflies, which floated, like a fairy vision, along the rugged slope on to which I had followed him, as he lured me gradually nearer to the fearful abyss.

Reclining under the lee of a huge rock,—whose bleak surface was studded with innumerable Saxifrages and Stonecrops, *growing out of nothing* in that delightful way which Swiss flowers seem to love—as near as I dared venture to the edge of the bottomless precipice, I gazed down the sheer 1,000 feet of mighty steep which raised me above the valley; and there I beheld men as ants crawling beneath, guiding their patient oxen along the narrow white thread which wound its sinuous coils, snake-like, through the valley. I drank in the intoxicating air which swept across from the Eiger Glacier, bearing on its wings the gurgling melody of harmonious cow-bells, and mingling with the joyful murmur of a score of untamed rivulets, which burst from the rock to dash themselves

into spray upon the crags below ; or, ever and anon, a dull roar, as some small avalanche escaped from its moorings and hurtled down the mountain-side, striking a thousand echoes which leaped from peak to peak, until they gradually sank into oblivion in the hazy distance of purple and snow. From time to time a soft mass of fleecy cloud would take me suddenly in the rear, wrap me for a moment in the



Swiss Saxifrage, growing in a cleft.

cool embrace of its clammy folds, dive over the edge of the chasm, and float off down the valley, like some phantom being, leaving in its train a sense of moist chill which instantly vanished into steam in the melting rays of the midday sun.

Around me upon every side was displayed a wealth of colour which no painter could attempt to reproduce. It was not yet hay-time, so that there remained for the fields and scented slopes another two or three weeks of glory ere they were clipped and hacked into

the appearance of shaven nudity which a Swiss landscape is compelled to wear by the time that the crowd of August tourists begins to invade the country.

Moreover, was I not within a mile of the famous Blumenthal, the Valley of Flowers?

Here were the purple cups of a tall Cranesbill, whose rich hues vied with the golden bells of the Globe-flower and the crimson spikes of the luxuriant Snakeshead, combining to produce a sheet of colour that was positively dazzling to the eye ; not a particle of green was visible, every available space being filled at once by the bright face of some flowering gem. When, from time to time, the keen breath of the mountain stirred through the mass of waving blossoms, there was created a kaleidoscopic effect of singular beauty and ever-varying hues, and one was fain to imagine oneself standing upon the brink of another world and gazing on a mighty sea whose every jewelled wave flashed a fresh colour as it rose and fell and surged with a wild beauty of its own!

Words fail me to describe the prismatic tints which shivered, like some glorious rainbow, from each separate gem in that living garment—the whole producing an impression that, once seen, is never forgotten, and must indeed be experienced to be believed.

Verily, if it had been upon one of such fair spots that the Almighty Eye had deigned to rest, when the work of Creation was completed, it is not surprising to be told that “He saw that it was good.” Far as the eye could reach it met with the same grand scheme of colour, varied perhaps on the higher ground by a patch of intense blue or vivid crimson,

where the sunbeams caught their reflection in the upturned faces of a bed of Gentians or a carpet of Primulas.

I once saw a picture by a celebrated painter, which provoked much adverse comment. The scene was taken from near the very spot I have attempted to describe above; and yet many critics asserted that the artist's imagination must have run away with him to a deplorable extent, maintaining that the wealth of colour which his canvas displayed was an exaggeration so gross as to be positively ridiculous, and that no such effect was ever seen in Nature. Never having visited that particular corner in the land of châteaux, I readily added my small bray to the general babel of those who had never been there either; so that it was with some feeling of shame that I found myself, some years later, suddenly deposited—after being jerked and bumped and bundled up a precipitous funicular railway—in the exact spot which the painter's brush had attempted to portray. As I gazed upon the vision,—scarce restraining the impulse to get out and *feel* it all, to see if it were real,—I was still as ready to admit that the artist had *not* represented the scene in accordance with the living reality outspread before me; but I added a rider, to the effect that he would have been nearer the mark had he filled a large bath with a mixture of different-coloured paints, and applied it to his canvas with the help of a carpet-brush!

Such was the scene over which my eye wandered when it happened to light upon the oasis which I have mentioned as jutting out from the side of the black rock, and was at once attracted by the sight of some moving specks among the green.

On bringing a strong glass to bear upon the objects I soon discovered the presence of two beautiful chamois, reposing under the very shadow of the overhanging crag, while several kids frolicked around them. Deliciously happy was the little group; the two proud mothers (one of which, by the way, was of an unusually light grey colour) peacefully blinking, as their jaws worked from side to side with a rhythmical motion; and the pretty youngsters, with their fascinating stubby noses, skipped about in transports of sheer exuberance at being alive, playfully butting at one another; or, ever and anon, in an absurd pretence at panic, making a sudden wild rush down the slope, to return the next instant and end in a frantic tumble at the feet of their staid parents!

At times, when the onslaught was a bit too furious to suit the mother's sense of decorum, she would rise slowly to her feet with a curious sort of jerk, make a vigorous butt at the form of the nearest offender, with a view to reminding him that there was a limit to the patience of even the most indulgent parent, and then, after giving an angry snatch at one of the rhododendrons hard by, would compose herself once more, to continue her ruminations. I was loth to leave the fascinating sight; but time and hotel gongs wait for no man, and I was compelled to take my departure, though not without the pleasant sensation that I had somehow been initiated into the inner mysteries of the nursery life of one of the most lovely of wild creatures!

But alas! the life of the baby chamois is not always so calm and undisturbed; there are cruel enemies which lie in wait for him, lurking among the dark rocks and hidden crags to compass his undoing; and at times a

piteous cry will hurriedly summon the parents to the rescue of their darling, struggling in the talons of a mighty eagle!

The fury with which the combatants will fight on these occasions is a sight never to be forgotten. A terrible encounter of this kind took place the week after we arrived, and, from the terrace of the hotel, every detail of the battle could plainly be seen with the help of a telescope. On the very edge of a sheer abyss the fight took place; and the valiant chamois, which had reached the spot before the eagle—misjudging the weight of the kid—had been able to rise with it out of the parent's reach, struggled fiercely for the possession of its darling; but at length, partly owing to the efforts of the eagle, and partly to the blind fury of the other's attack, the chamois overbalanced, and went flying through space, to be dashed to pieces on the rocks below! So the two loving hearts were not severed, even in death!

The triumphant eagle, slowly rising aloft with her burden, bore it off to the eager nestlings anxiously awaiting her return in their cyrie beneath a cleft of the wild mountain fastness.

Can we blame her?

Her nestlings must be fed, she might argue, had she the gift of tongues; and, although the piteous bleat of the terrified kid, shivering in that murderous clutch, may rend its poor mother's heart, yet there are her own little ones, whose hungry voices clamour from their rock-bound nursery; and is it not natural that she should consider them first?

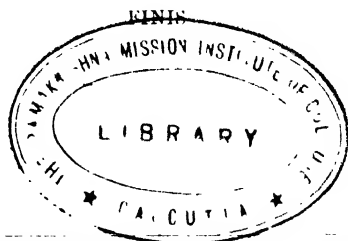
After all, it was the same impulse that moved the spirits of both combatants—the mother-instinct for

the welfare of their young—only their interests happened to clash.

Oh, why cannot eagles learn to eat grass!

* * *

In conclusion, I would crave pardon for any shortcomings of which I may have been guilty in this work, admitting that I have occasionally strayed widely from the point in order to relate some anecdote, or chronicle some experience that occurred to me at the time. Moreover, I have intentionally chosen from a large selection such instances which I hoped would prove of the most general interest; for the rest, I would refer my readers to Nature's own book, where they may spend a life-time in turning over the pages of a volume which has *no* ending, each one replete with a living charm essentially its own, reflecting, as in a mirror, the strange workings of that Magic Wand under whose mysterious spell the dead are quickened into life, and all things living are filled with loveliness!





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